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JANUARY, 1921

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Annual meeting, October

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Annual meeting, second Wednesday in January

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Annual meeting, first Monday in December

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Doyle, Jno. Willis.....Hill City
Graves, Carlton.....Aitkin

Kelly, B. W.....Aitkin
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Sweeney, Arthur.....St. Paul
Taylor, H. L.....St. Paul
Teisberg, C. B.....St. Paul
Van Slyke, Chas. A.....St. Paul
Vercellini, G.....St. Paul
Von der Weyer, Wm.....St. Paul
Wald, R. H.....So. St. Paul
Wallinga, John A.....St. Paul
Warren, E. L.....St. Paul
Warner, E. F.....St. Paul
Warwick, Margaret.....St. Paul
Welch, M. C.....St. Paul
Wheeler, M. W.....St. Paul
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Williams, Clayton.....St. Paul
Winnick, J. B.....St. Paul
Wold, K. C.....St. Paul
Wood, H. G.....St. Paul
Zander, C. H.....St. Paul
Zimmerman, H. B.....St. Paul

Washington County Medical Society

Regular meetings held the second Tuesday of the odd numbered months
Annual meeting, November

President
Newman, G. A.....Stillwater
Secretary
Landeon, F. G.....Stillwater

Burfiend, G. H.....St. Paul
Clark, G. E.....Stillwater
Freligh, E. O'B.....Stillwater
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Kallnoff, D.....Stillwater

Landeon, F. G.....Stillwater
Mingo, F. E.....Hugo
Newman, G. A.....Stillwater
Poirier, J. A.....Forest Lake
Stuhr, J. W.....Stillwater
Thompson, V. C.....Stillwater

Chisago-Pine County Medical Society

Regular meetings, January and July
Annual meeting, January

President
Murdock, H. G.....Taylors Falls
Secretary
Anderson, C. A.....Rush City
Anderson, C. A.....Rush City

Bohling, B. S.....Sandstone
Dredge, H. P.....Sandstone
Ehmke, Wm. E.....Willow River
Flom, A. O.....Chisago City
Kelsey, C. G.....Hinckley
Gray, C. E.....Rush City
Gunz, A. N.....Center City

Magnusson, Herman V.....Bell, Cal.
Murdock, H. G.....Taylors Falls
Stowe, A. J.....Rush City
Tilton, A. J.....Alden
Werner, O. S.....Landstrom
Wiseman, R. L.....Pine City
Zeien, Thos.....North Branch

Central Minnesota District Medical Society

Mille Lacs, Sherburne, Isanti and Kanabec
Regular meetings, January, April, July and October
Annual meeting, July

President
Cooney, H. C.....Princeton
Secretary
Parsons, G. E.....Elk River

Bacon, H. P.....Milaca
Clifton, Theo. A.....Isanti
Cooney, H. C.....Princeton
Parsons, G. E.....Elk River

Phelps, A. G.....Ogilvie
Rhein, J. E.....Mora
Roodman, I. M.....Ponsford
Shulean, Nellie.....Cambridge
Swensen, Charles.....Braham

St. Louis County Medical Society

Itasca, Cook and Lake

Regular meetings, second Thursday of each month
Annual meeting, second Thursday in October

President	
Shapiro, E. Z.	Duluth
Secretary	
Forbes, R. S.	Duluth
Abbott, Wm. P.	Duluth
Adams, B. S.	Hibbing
Arminen, K. V.	Duluth
Ayres, C. T.	Ely
Barney, L. A.	Duluth
Bagley, W. R.	Duluth
Berquist, K. E.	Duluth
Binet, H. E.	Grand Rapids
Boyer, S. H.	Duluth
Braden, A. J.	Duluth
Bray, C. W.	Blwabik
Brooks, G. F.	Minneapolis
Bullen, F. W.	Hibbing
Carstons, C. F.	Hibbing
Chapman, T. L.	Duluth
Cheney, E. L.	Duluth
Clark, F. F.	Duluth
Collins, A. N.	Duluth
Collins, H. C.	Duluth
Conkey, C. D.	Duluth
Cosgrove, J. H.	Duluth
Coventry, W. A.	Duluth
Crowe, J. H.	Virginia
Davis, H. S.	Duluth
Davis, B. J.	Duluth
Deslauriers, A. A.	Duluth
Doolittle, L. E.	Duluth
Drenning, F. C.	Duluth
Durgin, F. L.	Nopeming
Eissenman, W. G.	Chisholm
Ekblad, J. W.	Duluth
Eklund, J. J.	Duluth
Eklund, Wm. J.	Duluth
Elias, F. J.	Duluth
Fahey, E. W.	Duluth
Forbes, R. S.	Duluth
Farmer, J. C.	McKinley
Gendron, J. F.	Grand Rapids
Gillespie, N. H.	Duluth
Giroux, A. A.	Duluth
Goodman, C. E.	Virginia

Graham, David.	Duluth
Graham, R. D.	Duluth
Graham, Robert.	Duluth
Grawn, F. A.	Duluth
Greeley, L. Q.	Duluth
Ground, H. T.	Virginia
Gauthier, W.	Virginia
Hall, Andrea E.	Cusson
Haney, C. L.	Duluth
Hayes, M. F.	Nashauk
Heimark, O. E.	Duluth
Hirschboeck, F. J.	Duluth
Hirschfield, M. S.	Duluth
Hursh, M. M.	Grand Rapids
Jensen, T. J.	Duluth
Judson, W. E.	Duluth
Kean, N. D.	Coleraine
Kiesling, I. H.	Nashauk
Keyes, C. R.	Duluth
King, W. S.	Eveleth
Kraft, Peter.	Duluth
Kuth, J. R.	Duluth
Klein, Harry.	Duluth
Laird, A. T.	Nopeming
Lenont, C. B.	Virginia
Lepak, F. J.	Duluth
Lindgren, E. I.	Duluth
Linneman, N. L.	Duluth
Loofbourrow, Elias Homer.	Keewatin
Lum, C. E.	Duluth
Lynam, Frank.	Duluth
McComb, C. F.	Duluth
McCuen, J. A.	Duluth
McDonald, A. L.	Duluth
McGiffert, E. N.	Duluth
McHaffie, O. L.	Duluth
Magie, W. H.	Duluth
Martin, Edw. T.	Marble
Martin, T. R.	Duluth
Merriman, L. L.	Duluth
Morsman, L. W.	Hibbing
Moras, C. E.	Coleraine
More, C. W.	Eveleth
Murray, D. D.	Duluth

Nicholson, M. A.	Duluth
O'Neil, J. W.	Nashauk
Oredson, O. A.	Duluth
McGehre, E. C.	Hibbing
Pake, S. G.	Duluth
Paradino, J.	Duluth
Pare, L. T.	Duluth
Parker, O. W.	Ely
Payette, C. H.	Duluth
Powers, J. E.	Duluth
Pennie, D. F.	Duluth
Raadquist, C. S.	Hibbing
Raihalo, John.	Virginia
Reynolds, Hugh.	Hibbing
Rippert, J. A.	Proctor
Robinson, J. M.	Duluth
Rood, D. C.	Hibbing
Rowe, O. W.	Duluth
Scherer, C. A.	Duluth
Schroder, C. H.	Duluth
Schwartz, A. H.	Duluth
Seashore, D. E.	Duluth
Shapiro, E. Z.	Duluth
Shaw, A. W.	Buhl
Slyfield, F. F.	Duluth
Smith, C. M.	Coleraine
Spicer, F. W.	Duluth
Strother, M. L.	Gilbert
Sukeforth, L. A.	Duluth
Sutherland, H. N.	Ely
St. Clair, G. G.	Duluth
Saam, J. G.	Eveleth
Taylor, A. C.	Duluth
Taylor, C. W.	Duluth
Tibbetts, M. H.	Duluth
Tilderquist, D. L.	Duluth
Tuohy, E. L.	Duluth
Turnbull, F. M.	Duluth
Vercellini, C. E.	Duluth
Walker, A. E.	Duluth
Webber, Edward E.	Proctor
Webster, H. E.	Duluth
Wilkinson, Stella.	Duluth
Winter, J. A.	Duluth
Young, V. A.	Duluth

Carlton County Medical Society

Regular meetings, second Friday of each month
Annual meeting, December

President	
Stuart, A. B.	Cloquet
Secretary	
Raiter, Franklin W. S.	Cloquet

Blakeley, C. C.	Barrum
Brunet, L. M.	Cloquet
Fleming, James.	Cloquet
Gilbert, John.	Carlton

Raiter, Franklin W. S.	Cloquet
Spurbeck, R. G.	Cloquet
Stuart, A. B.	Cloquet
Walters, Franklin R.	Cloquet
	Moose Lake, Minn.

FOURTH DISTRICT

COUNCILOR, R. J. HILL, (1 year) Minneapolis

Hennepin County Medical Society Minneapolis

President	
Head, George Douglas.	Minneapolis
Secretary	
La Vake, R. T.	Minneapolis
Abbott, A. W.	Minneapolis
Adair, F. L.	Minneapolis
Allen, H. W.	Minneapolis
Anderson, A. E.	Minneapolis
Anderson, A. G.	Minneapolis
Anderson, J. D.	Minneapolis
Annis, H. B.	Minneapolis
Arey, H. C.	Excelsior
Aune, Martin.	Minneapolis
Aurand, W. H.	Minneapolis
Austin, E. E.	Minneapolis
Avery, J. F.	Minneapolis
Aylmer, A. L.	Minneapolis
Baker, A. T.	Minneapolis
Baker, E. L.	Minneapolis
Baker, H. A.	Minneapolis
Baker, Loee.	Minneapolis
Bakke, O. H.	Minneapolis
Baldwin, L. B.	Minneapolis
Bank, Harry E.	Minneapolis
Barron, Mosca.	Minneapolis

Barton, Edgar R.	Minneapolis
Baxter, S. H.	Minneapolis
Beard, Archie H.	Minneapolis
Beaudoux, Henry A.	Minneapolis
Bell, J. W. Jr.	Minneapolis
Bell, J. W.	Minneapolis
Benedict, E. E.	Minneapolis
Benjamin, A. E.	Minneapolis
Benn, F. G.	Minneapolis
Benson, Geo. E.	Minneapolis
Bessesen, A. N.	Minneapolis
Bishop, Chas. W.	Minneapolis
Bissell, F. S.	Minneapolis
Blake, James.	Minneapolis
Bockman, M.	Minneapolis
Booth, A. E.	Minneapolis
Boquist, E. T. W.	Minneapolis
Boreen, C. A.	Minneapolis
Bouman, H. A.	Minneapolis
Bratrud, A. F.	Minneapolis
Brooks, Chas. N.	Minneapolis
Brown, Edgar D.	Minneapolis
Brown, Paul F.	Minneapolis
Brown, R. S.	Minneapolis
Butler, John.	Minneapolis
Byrnes, W. J.	Minneapolis

Cabot, V. S.	Minneapolis
Camp, W. E.	Minneapolis
Campbell, L. M.	Minneapolis
Carlow, C. M.	Minneapolis
Cavanor, P. T.	Minneapolis
Craft, Leo. M.	Minneapolis
Cheelen, S. J.	Minneapolis
Cirkler, A. A.	Minneapolis
Clark, H. S.	Minneapolis
Cockrane, W. M.	Minneapolis
Condit, W. H.	Minneapolis
Cook, Henry W.	Minneapolis
Corbett, Frank J.	Minneapolis
Cosman, E. O.	Minneapolis
Cranmer, Richard R.	Minneapolis
Crume, Geo. P.	Minneapolis
Dahl, John A.	Minneapolis
Dart, Leslie O.	Minneapolis
Deziel, G.	Minneapolis
Disen, C. F.	Minneapolis
Donaldson, C. A.	Minneapolis
Doxey, G. L.	Minneapolis
Drake, C. R.	Minneapolis
Driesbach, N.	Minneapolis
Dunn, Louis.	Minneapolis
Dunsmoor, F. A.	Minneapolis

Egan, John M. Minneapolis
 Eitel, G. G. Minneapolis
 Erb, F. A. Minneapolis
 Erickson, J. G. Minneapolis
 Fansler, W. A. Minneapolis
 Farr, R. E. Minneapolis
 Fisher, F. Minneapolis
 Fjelstad, C. Alford. Minneapolis
 Flemming, A. S. Minneapolis
 Franzen, H. G. Minneapolis
 Gardner, Edwin L. Minneapolis
 Giessler, Paul W. Minneapolis
 Geist, Emil S. Minneapolis
 Green, E. K. Minneapolis
 Gordon, Geo. J. Minneapolis
 Guilford, H. M. Minneapolis
 Gunderson, Harley J. Minneapolis
 Hagen, G. L. Minneapolis
 Haggard, G. D. Minneapolis
 Hall, J. M. Minneapolis
 Hallowell, W. H. Minneapolis
 Hamel, Arnold L. Minneapolis
 Hamel, C. E. Minneapolis
 Hamilton, A. S. Minneapolis
 Hanson, Erling. Minneapolis
 Hanson, Olga S. Minneapolis
 Hare, E. R. Minneapolis
 Harrington, C. D. Minneapolis
 Hartzell, Thomas B. Minneapolis
 Havterfield, Addie K. Minneapolis
 Head, G. D. Minneapolis
 Hedback, A. E. Minneapolis
 Helm, Russell R. Minneapolis
 Helk, H. H. Minneapolis
 Hendrickson, J. F. Minneapolis
 Henry, C. E. Minneapolis
 Herrick, Stanley E. Minneapolis
 Hiebert, J. P. Minneapolis
 Higgins, J. H. Minneapolis
 Hill, Eleanor J. Minneapolis
 Hill, R. J. Minneapolis
 Hobbs, C. A. Minneapolis
 Hodge, S. V. Minneapolis
 Howe, A. W. Minneapolis
 Huenekens, E. J. Minneapolis
 Hynes, John E. Minneapolis
 Hvostel, Jacob. Minneapolis
 Iden, B. F. Minneapolis
 Ikeda, Kano. Minneapolis
 Irvine, H. G. Minneapolis
 Jarvis, Bruce W. Minneapolis
 Jensen, M. J. Minneapolis
 Jones, H. W. Minneapolis
 Jones, W. A. Minneapolis
 Johnson, A. Eloy. Minneapolis
 Johnson, Carl E. Minneapolis
 Johnson, James A. Minneapolis
 Johnson, Julius. Minneapolis
 Johnson, Nimrod. Minneapolis
 Johnson, R. A. Minneapolis
 Josewich, Alexander. Minneapolis
 Kennedy, C. C. Minneapolis
 Kennedy, Jane F. Minneapolis
 Kennedy, R. Ray. Minneapolis
 Kimball, H. H. Minneapolis
 King, W. R. Minneapolis
 King, E. A. Minneapolis
 Kirks, Geo. W. Minneapolis
 Kistler, C. M. Minneapolis
 Koch, John Charles. Minneapolis
 Kohler, G. A. Minneapolis
 Koller, Herman M. Minneapolis
 Koller, L. R. Minneapolis
 Knight, H. L. Minneapolis
 Kremer, Walter J. Minneapolis
 Kusske, A. L. Minneapolis
 La Vake, R. T. Minneapolis
 Lajoie, John M. Minneapolis
 La Pierre, C. A. Minneapolis
 Law, A. A. Minneapolis
 Laurent, A. A. Minneapolis
 I cavit, H. H. Minneapolis
 Lebowske, Joseph A. Minneapolis
 Leland, M. N. Minneapolis

Lewis, J. D. Minneapolis
 Lind, C. J. Minneapolis
 Linner, H. P. Minneapolis
 Linstrom, Jarl. Minneapolis
 Litchfield, John T. Minneapolis
 Litzenberg, J. C. Minneapolis
 Logefell, Rudolph C. Minneapolis
 Loomis, E. A. Minneapolis
 Lundgren, A. C. Minneapolis
 Lynch, M. J. Minneapolis
 Lyon, J. D. Minneapolis
 Lyng, John. Minneapolis
 Lysne, Henry. Minneapolis
 MacDonald, D. A. Minneapolis
 McEachran, A. Minneapolis
 McDaniel, Orianna. Minneapolis
 McDermott, T. E. Minneapolis
 McDonald, H. N. Minneapolis
 McDonald, Irving C. Minneapolis
 McIntyre, George. Minneapolis
 McKinney, F. S. Minneapolis
 McLaughlin, Jos. A. Minneapolis
 McPheeters, H. O. Minneapolis
 Macnie, J. S. Minneapolis
 Mann, A. T. Minneapolis
 Mathews, Justus. Minneapolis
 Marclay, W. J. Minneapolis
 Marlette, Ernest. Hopkins
 Mark, D. B. Minneapolis
 Mead, Marion. Minneapolis
 Markert, G. L. Minneapolis
 Meyer, E. L. Minneapolis
 Michael, J. C. Minneapolis
 Moir, Wm. W. Minneapolis
 Monahan, J. A. Minneapolis
 Monahan, R. H. Minneapolis
 Moorhead, M. B. Minneapolis
 Moren, E. Minneapolis
 Morse, John. Minneapolis
 Morris, R. E. Minneapolis
 Morrison, A. W. Minneapolis
 Morton, H. McI. Minneapolis
 Murdock, A. J. Minneapolis
 Murphy, T. J. Minneapolis
 Murray, W. R. Minneapolis
 Nelson, C. P. Minneapolis
 Nelson, H. S. Minneapolis
 Newhart, Horace. Minneapolis
 Nippert, L. A. Minneapolis
 Nissen, Henrik. Minneapolis
 Nixon, Chas. C. Minneapolis
 Nordin, G. T. Minneapolis
 Noonan, Dan F. Minneapolis
 Nordland, Martin. Minneapolis
 Noth, H. W. Minneapolis
 Oberg, C. M. Minneapolis
 O'Donnel, J. E. Minneapolis
 Olson, F. A. Minneapolis
 Orton, H. N. Minneapolis
 Owre, Oscar. Minneapolis
 Paulsen, E. L. Minneapolis
 Parker, E. H. Minneapolis
 Parks, A. H. Minneapolis
 Patterson, W. E. Minneapolis
 Pedersen, R. M. Minneapolis
 Peppard, T. A. Minneapolis
 Perry, Ralph St. John. Minneapolis
 Peters, R. M. Minneapolis
 Peterson, O. H. Minneapolis
 Peterson, Thorvald. Minneapolis
 Pettitt, C. W. Minneapolis
 Phelps, Kenneth. Minneapolis
 Pineo, W. B. Minneapolis
 Poehler, F. T. Minneapolis
 Poppe, Fred H. Minneapolis
 Pratt, Fred J. Minneapolis
 Pratt, J. A. Minneapolis
 Priene, I. A. Minneapolis
 Prim, J. A. Minneapolis
 Quinby, Thomas F. Minneapolis
 Quist, H. W. Minneapolis
 Rees, S. F. Minneapolis
 Reynolds, J. S. Minneapolis
 Rishmiller, J. H. Minneapolis

Roan, Carl M. Minneapolis
 Robert, Thomas S. Minneapolis
 Roberts, W. B. Minneapolis
 Robertson, H. E. Minneapolis
 Rochford, W. E. Minneapolis
 Robitshek, E. C. Minneapolis
 Rodda, F. C. Minneapolis
 Rodgers, C. L. Minneapolis
 Rosen, S. Minneapolis
 Schaaf, F. H. K. Minneapolis
 Schefcik, J. F. Minneapolis
 Schneider, J. P. Minneapolis
 Schultz, Fred W. Minneapolis
 Schwyzer, G. Minneapolis
 Seashore, Gilbert. Minneapolis
 Sedgwick, J. P. Minneapolis
 Seham, Max. Minneapolis
 Sessions, John. Minneapolis
 Simons, Jalmar. Minneapolis
 Simpson, E. D. Minneapolis
 Simpson, J. D. Minneapolis
 Sivertsen, Ivar. Minneapolis
 Slocumb, Maude S. Minneapolis
 Smith, Arthur. Minneapolis
 Smith, Homer R. Minneapolis
 Smith, Norman. Minneapolis
 Soderlind, A. Minneapolis
 Souba, Fred. J. Minneapolis
 Spratt, C. N. Minneapolis
 Staples, H. L. Minneapolis
 Stomel, Joseph. Minneapolis
 Stuhr, Henry C. Minneapolis
 Strachauer, A. C. Minneapolis
 Strout, E. S. Minneapolis
 Sweetser, H. B. Minneapolis
 Sweetser, Theo. Minneapolis
 Sweetzer, S. E. Minneapolis
 Taft, John O. Minneapolis
 Taft, Walter L. Minneapolis
 Tanner, A. C. Minneapolis
 Ten Brock, Louis. Minneapolis
 Terryson, Th. Minneapolis
 Thomas, D. O. Minneapolis
 Thomas, Geo. E. Minneapolis
 Thomas, Gilbert A. Minneapolis
 Thompson, H. H. Minneapolis
 Tingdale, A. C. Minneapolis
 Towers, F. E. Minneapolis
 Tunstead, Hugh. Minneapolis
 Tyrrell, C. C. Minneapolis
 Ulrich, Henry L. Minneapolis
 Ulrich, Mabel S. Minneapolis
 Undine, A. Clyde. Minneapolis
 Urstad, O. H. Minneapolis
 Van Deboget, Lewis. Minneapolis
 Yvisaker, L. S. Minneapolis
 Voyer, Oswald. Minneapolis
 Waldron, Carl W. Minneapolis
 Wanous, E. Z. Minneapolis
 Ward, A. W. Minneapolis
 Warham, T. T. Minneapolis
 Watson, J. A. Minneapolis
 Webb, R. C. Minneapolis
 Weisman, S. A. Minneapolis
 Wells, H. J. Minneapolis
 Weston, C. G. Minneapolis
 Weum, T. Wm. Minneapolis
 White, Marx S. Minneapolis
 Wilcox, Ancha E. Minneapolis
 Wilcox, M. Russell. Minneapolis
 Willcutt, Clarence. Minneapolis
 Williams, Robert. Minneapolis
 Willson, Hugh S. Minneapolis
 Witham, C. A. Minneapolis
 Wittich, F. W. Minneapolis
 Wohlrahe, A. A. Minneapolis
 Wood, Douglas F. Minneapolis
 Woodard, F. R. Minneapolis
 Wright, C. B. Minneapolis
 Wright, C. Darcy. Minneapolis
 Wright, Franklin R. Minneapolis
 Wynne, H. M. N. Minneapolis
 Yerg, O. W. Minneapolis
 Zawiske, E. A. Minneapolis
 Ziskin, Thomas. Minneapolis

Wright County Medical Society

Regular meetings, first Monday quarterly
 Annual meeting, October

President
 Harriman, L. Howard Lake
 Secretary
 Catlin, J. J. Buffalo
 Catlin, J. J. Buffalo

Filison, Frank E. Monticello
 Freed, O. J. R. Kokato
 Harriman, L. Howard Lake
 Metcalf, James N. Monticello
 Moffatt, A. G. Howard Lake
 Phillips, A. E. Delano

Ridgway, A. M. Annandale
 Roholt, C. L. South Haven
 Rosseau, Victor. Maple Lake
 Shrader, E. E. Watertown
 Thoresen, Th. Buffalo
 Hawkins, E. P. Montrose

Meeker County Medical Society

President
Donovan, J. J. Litchfield
Secretary
Danielson, K. A. Litchfield
Brigham, Frank Eden. Valley

Chapman, W. E. Litchfield
Cutts, G. A. C. Litchfield
Danielson, K. A. Litchfield
Donovan, J. J. Litchfield
Dulude, S. Dassel

O'Connor, Dr. Eden Valley
Peterson, Alfred. Dassel
Robertson, W. P. Litchfield
Robertson, A. W. Litchfield
Sturte, J. R. Watkins

Stearns-Benton County Medical Society

Regular meetings, quarterly
Annual meeting, third Thursday in April

President
Beebe, W. L. St. Cloud
Secretary
Clark, H. B. St. Cloud
Ausman, C. F. Paynesville
Beebe, W. L. St. Cloud
Boehm, J. C. St. Cloud
Beatty, J. H. St. Cloud
Brigham, C. F. St. Cloud
Clark, H. B. St. Cloud
DuBois, J. A. Sauk Center
DuBois, I. F. Sauk Center
Edmunds, I. L. Clearwater

Freeman, W. L. Foley
Friesleben, Wm. Sauk Rapids
Pilon, P. C. Paynesville
Putney, G. E. Paynesville
Rathburne, A. M. Rice
Rathburne, C. A. Sauk Rapids
Ridgeway, Alex. Belgrade
Rice, G. D. St. Cloud
Gulde, W. C. Minneapolis
Gelz, J. J. Richmond
Glyer, R. T. Brooten
Goehrs, H. W. St. Cloud
Hemstad, Werner. St. Cloud

Holdridge, Geo. Foley
Kulmann, Aug. Melrose
Lewis, E. J. Sauk Center
Lewis, C. B. St. Cloud
McDowell, J. P. St. Cloud
Moynihan, A. F. Sauk Centre
May, C. E. Minneapolis
McKibben, N. E. St. Cloud
Sherwood, G. E. Kimball
Sutton, Chas. S. St. Cloud
Watson, Tolbert. Albany
Whiting, A. D. St. Cloud
Wolner, Oscar H. Gilbert

Kandiychi-Swift County Medical Society

Regular meetings, third Thursday in March, June, September and December
Annual meeting, third Thursday in December

President
Branton, B. J. Willmar
Secretary
Jacobs, John C. Willmar
Benson, I. S. Willmar
Bergheim, M. C. Raymond

Branton, B. J. Willmar
Branton, A. F. Willmar
Daigault, O. Benson
Danison, P. C. Willmar
Ehrenberg, C. J. Willmar
Frost, E. H. Willmar

Hanson, H. J. New London
Jacobs, John C. Willmar
Johnson, Hans. Kerkhoven
Kolset, Carl D. Benson
Rains, J. M. Willmar
Scofield, C. L. Benson
Shelver, H. J. Ortonville

FIFTH DISTRICT

COUNCILOR, H. M. WORKMAN, M. D. (2 years) Tracy

Camp Release District Medical Society

Renville, Chippewa, Lac Qui Parle, Sibley counties
Regular meetings, fourth Thursday in January, April, July and October
Annual meeting, fourth Thursday in October

President
Adams, R. C.
Secretary
Peterson, H. E. Granite Falls
Aldrich, F. H. Belview
Bacon, R. S. Montevideo
Barfield, J. J. Granite Falls
Bergh, L. N. Montevideo
Burns, M. A. Milan
Bushey, M. E. Arlington
Clay, E. M. Renville
Crandall, A. M. Madison
Cress, E. E. Boyd
Cole, H. B. Redwood Falls

Eisengraeben, G. A. Granite Falls
Duclos, J. A. Henderson
Duncan, Henry. Marietta
Ferguson, J. B. St. Paul
Flinn, B. P. Redwood Falls
Flinn, T. E. Redwood Falls
Flower, W. Z. Minneapolis
Fritsch, F. P. Gibbon
Guyer, L. A. Waseca
Hauge, M. M. Clarksfield
Holmberg, L. J. Canby
Hovde, Rolf. Winthrop
Johnson, H. M. Dawson
Johnson, C. M. Dawson
Kanne, C. W. Faribault

Lee, Walter N. Madison
Lima, Ludwig. Montevideo
Maercklein, S. R. Renville
Mee, P. H. Onseo
Mesken, G. H. Olivia
Olson, W. P. Gaylord
Passer, A. A. Olivia
Peterson, H. E. Granite Falls
Penhall, F. W. Morton
Puffer, F. L. Bird Island
Stemsrud, A. A. Dawson
Smith, L. G. Montevideo
Walker, G. H. Fairfax
Westby, Nels. Madison
Zimbeck, R. D. Maynard

Redwood-Brown County Medical Society

Regular meeting, June
Annual meeting, August 10th

President
Walker, C. C. Lamberton
Secretary
Meierding, Wm. A. Springfield
Adams, J. L. Morgan
Eckstein, A. W. Comfrey
Gray, F. D. Marshall

Haskins, John L. Morgan
Jamieson, Earl. Walnut Grove
Meierding, Wm. A. Springfield
Pelant, F. J. New Ulm
Perkins, J. Sanborn
Peterson, R. A. Vesta
Rothenburg, J. C. Springfield

Schoch, J. L. New Ulm
Shrader, J. S. Springfield
Strickler, A. F. Sleepy Eye
Strickler, Mary. Sleepy Eye
Sundt, M. Minneapolis
Walker, C. C. Lamberton
Weiser, Geo. New Ulm

Lyon-Lincoln County Medical Society

Regular meetings, first Tuesday in March, May and July
Annual meeting, October

President
Germo, Chas. Balator
Secretary
Workman, H. M. Tracy
Bacon, C. G. Marshall
Bossingham, O. N. Lake Benton

Engh, Sigfred. Cottonwood
Germo, Chas. Balator
Hall, E. L. Russell
Hoidale, A. D. Tracy
Jacquiat, G. L. Ivanhoe
Jensen, J. C. Hendricks
Persons, C. E. Marshall

Robertson, J. B. Cottonwood
Sanderson, E. G. Minneota
Thoradson, Theo. Minneota
Vadheim, A. L. Tyler
Valentine, W. H. Tracy
Workman, H. M. Tracy
Workman, W. C. Tracy

SIXTH DISTRICT

COUNCILOR, F. R. WEISER, (1 year).....Windom

Southwestern Minnesota Medical Society

Pipestone, Rock, Murrey, Nobels, Cottonwood, Jackson counties

Regular meeting, May 12th
Annual meeting, November 10th

President
Watson, F. G.....Worthington

Secretary
McKeown, E. G.....Pipestone
Atkins, G. L.....Jackson
Arnold, E. W.....Adrian
Balcom, G. G.....Lake Wilson
Bang, J. H.....Jasper
Brown, A. H.....Pipestone
Chadbourn, A. G.....Heron Lake
Cress, P. J.....Ellsworth
De Boer, Hermanus.....Edgerton
Dolan, C. P.....Worthington
Doms, H. C.....Slayton
Ditmeier, L. M. Gerber.....Jasper
Dudley, J. H.....Windom
Goldberg, M. L.....Jasper

Golden, C. M.....Tyler
Hitchings, W. P.....Lakefield
Hilger, J. M.....Iona
Jenckes, H. D.....Pipestone
Keeling, F. L.....Lakefield
Knutson, H. M.....Pipestone
Leigh, H. J.....Lakefield
Lowe, Thos. A.....Pipestone
Lowe, Thos. A.....Pipestone
McCrea, James.....Fulda
McIntyre, John A.....Round Lake
McKeown, E. G.....Pipestone
Manson, F. M.....Worthington
May, C. C.....Adrian
Metcalf, F. W.....Fulda
Mark, B. O.....Worthington
Patterson, W. E.....Westbrook
Piper, Wm. A.....Mountain Lake

Ravu, B.....Windom
Richardson, W. E.....Pipestone
Richmond, Chas. D.....Jeffers
Rose, J. T.....Lakefield
Stanley, C. R.....Worthington
Sherman, C. L.....Luverne
Smallwood, J. T.....Worthington
Slater, S. A.....Worthington
Sogge, L.....Windom
Taylor, Wm. J.....Pipestone
Thoreson, E. O.....Luverne
Tiedeman, I. D.....Adrian
Tofte, Josephine.....Pine City
Waller, Jas. D.....Wilmon
Watson, F. G.....Worthington
Weiser, F. R.....Windom
Williams, A. L.....Slayton
Wright, C. O.....Luverne

Blue Earth Valley Medical Society

Martin and Faribault counties

Regular meetings, May and October
Annual meeting, May 26, 1921

President
Broberg, J. A.....Blue Earth

Secretary
Hunt, R. C.....Fairmont
Bailey, H. B.....Ceylon
Broberg, J. A.....Blue Earth
Butz, J. A.....Monterey
Cooper, M. D.....Winnebago City

Chambers, W. C.....Blue Earth
Dewey, G. W.....Fairmont
Farrage, J. H.....Winnebago City
Gough, W. H.....Granada
Henderson, A. G.....Klester
Hohn, P. F.....Wells
Hunt, F. N.....Fairmont
Hunt, R. C.....Fairmont
Hunte, A. F.....Truman

Jacobs, A. C.....Elmore
Johnson, H. P.....Fairmont
Luedtke, G. H.....Fairmont
Logan, F. W.....Blue Earth
McGroarty, J. J.....Easton
Richardson, W. J.....Fairmont
Stroble, W. G.....Welcome
Sybilrud, H. W.....Bricelyn
Wilson, C. E.....Blue Earth

Watsonwan County Medical Society

Annual meeting, December

President
Thompson, Albert.....St. James

Secretary
Hodapp, R. J.....Madella

Grimes, A. B.....Madella
Hogen, O. E.....Butterfield
Hodapp, R. J.....Madella
Haynes, B. H.....St. James

Kabrick, O. A.....Odin
McCarthy, W. J.....Madella
Rowe, W. H.....St. James
Thompson, Albert.....St. James

SEVENTH DISTRICT

COUNCILOR, F. A. DODGE, M. D. (1 year).....Le Sueur

Nicollet-Le Sueur County Medical Society

Regular meetings, September and December
Annual meeting, second Tuesday in December

President
Covell, W. W.....St. Peter

Secretary
Le Clerc, J. E.....Le Sueur
Aitkins, H. B.....Le Sueur Center
Baskett, Geo. T.....St. Peter

Baskett, Olive T.....St. Peter
Covell, W. W.....St. Peter
Covey, Herman.....Knoxville, Iowa
Daniels, J. W.....St. Peter
Dodge, F. A.....Le Sueur
Elrley, Clara.....Mt. Pleasant, Ia.
Freeman, Geo. H.....Willmar
Hartung, H. A.....Le Sueur

Le Clerc, J. E.....Le Sueur
McDougald, D. W.....Le Sueur
Meillicke, W. W.....Nicollet
Merritt, G. F.....St. Peter
Olson, R. G.....Minneapolis
Phelps, R. M.....St. Peter
Strother, F. P.....St. Peter
Woodworth, L. F.....Le Sueur Center

McLeod County Medical Society

Regular meetings, January, April, July and October
Annual meeting, January

President
Clement, J. B.....Lester Prairie

Secretary
Maurer, E. L.....Brownton

Bolles, D. W.....Galveston, Tex.
Barrett, E. E.....Glencoe
Clement, J. B.....Lester Prairie
Jellison, E. R.....New Auburn

Kohler, F. G.....Hector
Maurer, E. L.....Brownton
Sheppard, Fred.....Hutchinson
Sheppard, P. E.....Hutchinson
Tinker, C. W.....Stewart

Scott-Carver Medical Society

Regular meetings, first Thursday in March, June, September and December
Annual meeting, first Thursday in December

President
Bohland, F. J.....Belle Plaine

Secretary
Relter, H. W.....Shakopee
Bohland, F. J.....Belle Plaine

Buck, Fred H.....Shakopee
Cannady, E. E.....Prior Lake
Fischer, H. P.....Shakopee
Henriksen, H. G.....New Market
Landenberger, John.....New Prague
Maertz, W. F.....New Prague

Moloney, G. R.....Belle Plaine
Mulder, John L.....Chaska
Novak, E. E.....New Prague
Relter, H. W.....Shakopee
Schneider, H. A.....Jordan
White, J. B.....Belle Plaine

Goodhue County Medical Society

Regular meetings, January 12th and August 15th
Annual meeting, January 10th, 1921

President		Aanes, A. M.....Red Wing	Johnson, A. E.....Red Wing
Conley, Alva A.....Cannon Falls		Clayden, L. E.....Red Wing	Jones, A. W.....Red Wing
Secretary		Conley, Alva A.....Cannon Falls	McGuigan, H. T.....Red Wing
Werner, N. L.....Red Wing		Conley, H. E.....Cannon Falls	Sawyer, P. W.....Goodhue
Anderson, J. V.....Red Wing		Cremer, M. H.....Red Wing	Smith, M. W.....Red Wing
		Gates, J. A.....Kenyon	Werner, N. L.....Red Wing

Rice County Medical Society

Regular meeting, first Wednesday, January, April, July and October
Annual meeting, first Wednesday in January

President		Hanson, A. M.....Faribault	Plonski, C. J.....Faribault
Wilson, Warren.....Northfield		Hunt, W. A.....Northfield	Robilliard, C. M.....Faribault
Secretary		Huxley, F. R.....Faribault	Robilliard, W. H.....Faribault
Mayland, M. L.....Faribault		Lane, Laura A.....Faribault	Rumph, W. H.....Faribault
Babcock, F. M.....Northfield		Lee, W. P.....Northfield	Smith, P. A.....Faribault
Davis, F. U.....Faribault		Lexa, F. J.....Lonsdale	Theissen, W. H.....Faribault
Fields, Merton.....Northfield		Mayland, M. L.....Faribault	Traeger, C. A.....Faribault
Haessley, S. B.....Faribault		Morse, W. E. H.....Morristown	Warren, F. S.....Faribault
		Phillips, J. G.....Northfield	Wilson, Warren.....Northfield

Wabasha County Medical Society

Regular meetings, annually first Thursday after first Monday in July

President		Bowers, J. T.....Lake City	Radabaugh, R. C.....Hastings
Heagerty, W. B.....Mazeppa		Bowers, H. E.....Lake City	Rankin, A. A.....Zumbro Falls
Secretary		Branyan, Hugo.....Wabasha	Replogle, W. H.....Wabasha
Wilson, W. F.....Lake City		Dempsey, D. P.....Kellogg	Schmidt, G.....Lake City
Bayley, E. H.....Lake City		Feischauer, D. S.....Wabasha	Slocumb, J. A.....Plainview
		Heagerty, W. B.....Mazeppa	Wilson, W. F.....Lake City

EIGHTH DISTRICT

COUNCILOR, W. F. BRAASCH, M. D. (2 years).....Rochester

Blue Earth County Medical Society

Regular meetings, first Wednesday, January, April, July and October
Annual meeting, December

President		Edwards, Ralph.....Elysian	Osborn, Lida.....Mankato
Snell, Albert N.....Mankato		Franchere, F. W.....Lake Crystal	Pratt, C. C.....Mankato
Secretary		Holman, C. J.....Mankato	Sohmer, A. E.....Mankato
Liedloff, A. G.....Mankato		Holbrook, J. S.....Mankato	Schmitt, A. F.....Mankato
Andrews, J. W.....Mankato		James, J. H.....Mankato	Schmidt, P. A.....Good Thunder
Andrews, R. N.....Mankato		Kemp, A. F.....Mankato	Schlesselman, J. T.....Mankato
Benhan, E. W.....Mankato		Lloyd, H. J.....Mankato	Snell, Albert N.....Mankato
Black, Wm.....Mankato		Liedloff, A. G.....Mankato	Wentworth, A. J.....Mankato
Dahl, G. A.....Mankato		Miller, V. L.....Mankato	Williams, Hugh O.....Lake Crystal
Denman, A. V.....Mankato		Merrill, J. E.....Amboy	Williams, John.....Lake Crystal

Houston-Fillmore County Medical Society

No regular meetings
Annual meeting, October

President		Eby, C. B.....Spring Valley	Nelson, M. S.....Spring Grove
Helland, G. M.....Spring Grove		Fischer, O. F.....Houston	Nass, H. A.....Mabel
Secretary		Foster, Bainbridge.....Spring Valley	Onsgard, C. K.....Halstad
Fischer, O. F.....Houston		Helland, G. M.....Spring Grove	Onsgard, L. K.....Houston
Anderson, Norman E.....Harmony		Helland, J. W.....Spring Grove	Rhines, D. C.....Caledonia
Browning, W. E.....Caledonia		Kibbe, O. A.....Canton	Sather, E. R.....Spring Valley
Collins, J. S.....Caledonia		Kierland, P. E.....Harmony	Tierney, C. M.....Granger
Drake, F. A.....Lanesboro		Lannin, J. C.....Mabel	Uteley, J. D.....Minneapolis
		Lommen, A. P.....Lanesboro	Williams.....Rushford
		Love, Geo. A.....Preston	Woodruff, C. W.....Chatfield

Mower County Medical Society

Regular meetings, second Wednesday in January, April, July and October
Annual meeting, second Wednesday in October

President		Hart, M. J.....Le Roy	Melzer, R. G.....Lyle
Grise, W. B.....Austin		Hegge, C. A.....Austin	Mitchell, R. S.....Grand Meadow
Secretary		Hegge, O. H.....Austin	Moore, W. J.....Adams
Baker, G. L.....Austin		Henslin, A. E.....Le Roy	Morse, M. P.....Le Roy
Allen, A. W.....Austin		Hertel, G. E.....Austin	Morris, E. H.....Austin
Allen, Chas. C.....Austin		Havens, John G. W.....Austin	Pierson, Homer F.....Austin
Baker, G. L.....Austin		Lewis, Chas. F.....Austin	Rebman, E. C.....Austin
Cobb, W. F.....Northfield		Leck, Clifford C.....Austin	Shottler, G. J.....Dexter
Coleman, F. B.....Austin		Lommen, P. A.....Austin	Torkelson, P. T.....Lyle
Grise, W. B.....Austin		McKenna, J. C.....Austin	Warren, C. L.....Le Roy

Dodge County Medical Society

No regular meetings
Annual meeting, second Wednesday in August

President
Baker, H. R. Hayfield
Secretary
Bigelow, C. E. Dodge Center

Adams, R. T. Mantorville
Baker, A. L. Kasson
Beet, W. E. Dodge Center
Bigelow, C. E. Dodge Center

Clifford, F. F. West Concord
Harrison, E. E. West Concord
Smith, F. D. Kasson
Way, O. L. Claremont

Olmstead County Medical Society

Regular meetings, second Wednesday, April, June, September and December
Annual meeting, second Wednesday in December

President
Pollock, L. W. Rochester
Secretary
Allen, W. A. Rochester
Adson, A. W. Rochester
Asbury, J. T. Chatfield
Bissell, W. W. Rochester
Bleifus, W. F. Rochester
Barlow, R. A. Rochester
Balfour, D. C. Rochester
Benedict, W. L. Rochester
Berkman, D. M. Rochester
Bowling, H. H. Rochester
Braasch, W. F. Rochester
Broders, A. C. Rochester
Buile, L. A. Rochester
Bumpus, H. C. Rochester
Connor, H. M. Rochester
Grenshaw, J. L. Rochester
Crews, J. E. Rochester
Dolder, F. C. Eyota
Eusterman, G. B. Rochester
Evarts, Arab B. Rochester
Fawcett, C. E. Stewartville
Gamble, J. W. Rochester
Giffin, H. Z. Rochester
Granger, C. T. Rochester

Goekerman, W. H. Rochester
Granger, S. Booker. Rochester
Graham, C. Rochester
Hallenbeck, D. F. Rochester
Hartman, H. R. Rochester
Hayes, J. M. Rochester
Hollberg, C. A. Rochester
Hedblom, C. A. Rochester
Henderson, M. S. Rochester
Heyerdale, O. C. Rochester
Howard, S. E. Rochester
Huffman, R. W. Elgin
Hunt, V. C. Rochester
Joyce, G. T. Rochester
Judd, E. S. Rochester
Kilbourne, A. F. Rochester
King, C. P. Rochester
Lillie, W. F. Rochester
Lille, H. L. Rochester
Lemon, W. S. Rochester
Linton, W. B. Rochester
Logan, A. H. Rochester
Lyon, H. R. Rochester
Mostin, E. V. Rochester
Masson, J. C. Rochester
Mayo, C. H. Rochester
Mayo, W. J. Rochester
Melson, O. C. Rochester
Meyerding, H. W. Rochester

Moore, A. B. Rochester
Muehlig, G. F. Rochester
Mussey, R. D. Rochester
New, G. B. Rochester
O'Leary, P. A. Rochester
Ohlinger, L. B. Rochester
Pemberton, J. de J. Rochester
Piper, M. C. Rochester
Plummer, H. S. Rochester
Plummer, W. A. Rochester
Pollock, L. W. Rochester
Prangan, A. D. Rochester
Rosenow, E. C. Rochester
Russell, H. R. Stewartville
Sanford, A. H. Rochester
Sheldon, W. D. Rochester
Sistrunk, W. E. Rochester
Smith, F. L. Rochester
Stacey, L. J. Rochester
Steven, Geo. Byron
Stokes, J. H. Rochester
Sutton, G. E. Rochester
Szlapka, T. J. Rochester
Vinson, P. P. Rochester
Withersatne, H. H. Rochester
Wildner, R. M. Rochester
Willius, F. A. Rochester
Wilson, L. B. Rochester
Woltman, H. W. Rochester

Waseca County Medical Society

Annual meeting, December 10th, 1921

President
Chamberlain, W. A. Waseca
Secretary
Miller, H. A. Waseca

Chamberlain, W. A. Waseca
Cory, W. H. Waterville
Hagen, H. O. New Richland
Lynn, J. F. Waseca

McIntire, H. M. Waseca
Joyce, T. M. Janesville
Miller, H. A. Waseca
O'Hara, J. J. Jaynesville
Swartwood, F. A. Waseca

Winona County Medical Society

Regular meetings, first Tuesday, January, April, July, October
Annual meeting in January

President
Rosenberry, B. P. Winona
Secretary
Robbins, C. P. Winona
Bear, H. C. St. Charles, Minn.
Benolt, T. F. Winona
Clay, F. H. St. Charles
Heisl, W. F. C. Winona

Keyes, E. D. Winona
Leicht, O. Winona
Lester, C. A. Winona
Leichtenstein, H. Winona
Lindsay, W. V. Winona
Lynch, J. L. Winona
McLaughlin, E. M. Winona
Nauth, W. W. Winona
Neuman, C. A. Lewiston

Neuman, W. A. Lewiston
Prichard, D. B. Winona
Robbins, C. P. Winona
Rollins, F. H. St. Charles
Rosenberry, B. P. Winona
Steiner, I. W. Winona
Schaffer, S. Winona
Scott, F. W. St. Charles
Tweedy, G. Winona

Freeborn County Medical Society

Regular meetings upon call of members
Annual meeting, November

President
Von Berg, J. P. Albert Lea
Secretary
Schultz, J. A. Albert Lea
Beasemen, W. A. Minneapolis
Burns, H. D. Albert Lea

Butturff, C. R. Freeborn
Calhoun, F. W. Albert Lea
Folken, F. G. Albert Lea
Freeman, J. P. Glenville
Gullixson, A. Albert Lea
Kamp, B. A. Albert Lea

Nannestad, J. R. Albert Lea
Palmer, W. L. Albert Lea
Schultz, J. A. Albert Lea
Stevenson, R. G. Albert Lea
Vollum, E. O. Albert Lea
Von Berg, J. P. Albert Lea

Steele County Medical Society

Regular meetings, first Tuesday of each month
Annual meeting in December

President
E. W. Senn. Owatonna
Secretary
Andrist, J. W. Owatonna
Adair, J. H. Owatonna
Andrist, J. W. Owatonna

Daily, W. J. Blooming Prairie
Ertel, E. Q. Ellendale
Hart, A. B. Owatonna
Morehouse, G. G. Owatonna
Melby, Benedict. Blooming Prairie
Peterson, Christian. Owatonna

Smersh, F. M. Owatonna
Smersh, J. F. Owatonna
Senn, E. W. Owatonna
Stewart, A. B. Owatonna
Thimms, N. C. Blooming Prairie
Warren, J. W. Minneapolis

ALPHABETICAL ROSTER

Aanes, A. M. Red Wing
Abbott, S. W. Minneapolis
Abbott, J. S. St. Paul
Abbott, Wm. P. Duluth
Aborn, W. H. Hawley
Abramovich, J. H. St. Paul
Adair, F. L. Minneapolis
Adair, J. H. Owatonna
Adams, B. S. Hibbing
Adams, J. L. Morgan
Adams, R. C. Bird Island
Adams, R. T. Mantorville
Adkins, C. M. Thief River Falls
Adson, A. W. Rochester
Ahrens, A. E. St. Paul
Ahrens, A. H. St. Paul
Aitkens, H. B. Le Sueur Center
Aldrich, F. H. Belview
Allen, A. W. Austin
Allen, Chas. C. Austin
Allen, F. H. Staples
Allen, H. W. Minneapolis
Alden, J. T. St. Paul
Aides, Harry. St. Paul
Alexander, F. H. St. Paul
Allen, Mason. St. Paul
Allen, W. A. Rochester
Ancker, A. B. St. Paul
Anderson, A. E. Minneapolis
Anderson, A. G. Minneapolis
Anderson, C. A. Rush City
Anderson, J. D. Minneapolis
Anderson, J. V. Red Wing
Anderson, Norman E. Harmony
Andrews, J. W. Mankato
Andrews, R. N. Mankato
Annis, H. B. Minneapolis
Andrist, J. W. Owatonna
Archibald, F. M. Mankato
Arends, A. L. St. Paul
Armstrong, J. M. St. Paul
Arouni, Khalil. St. Paul
Arey, H. C. Excelsior
Arminen, K. V. Duluth
Arnold, E. W. Adrian
Arzt, C. P. St. Paul
Ashbury, J. T. Chaffield
Atkins, G. L. Jackson
Aune, Martin. Minneapolis
Aurand, W. H. Minneapolis
Ausman, C. F. Paynesville
Austin, E. E. Minneapolis
Ayres, C. T. Ely
Aylmer, A. L. Minneapolis

Babcock, F. M. Northfield
Bacon, C. G. Marshall
Bacon, H. P. Milaca
Bacon, L. C. St. Paul
Bacon, Knox. St. Paul
Bacon, R. S. Montevideo
Badeaux, G. I. Brainerd
Bagley, W. R. Duluth
Bailey, H. B. Ceylon
Baker, A. C. Fergus Falls
Baker, A. L. Kasson
Baker, E. L. Minneapolis
Baker, G. L. Austin
Baker, H. A. Minneapolis
Baker, Looe. Minneapolis
Balcom, G. G. Lake Wilson
Balcome, F. E. St. Paul
Baldwin, L. B. Minneapolis
Balfour, E. A. Rochester
Ball, C. R. St. Paul
Bank, Harry E. St. Paul
Barfield, J. J. Granite Falls
Barlow, R. A. Rochester
Barney, L. A. Duluth
Barr, W. H. Wells
Barrett, E. E. Glencoe
Barron, Moses. Minneapolis
Barry, L. W. St. Paul
Barsness, Nellie. St. Paul
Barton, Edgar R. Minneapolis
Baskett, George T. St. Peter
Baskett, Olive T. St. Peter
Baxter, S. H. Minneapolis
Bayley, E. H. Lake City
Beach, Geo. Wm. Dayton, Ohio
Beadle, W. D. St. Paul
Beale, Hugh. St. Paul
Bear, H. C. St. Charles
Beard, Archie H. Minneapolis

Beatty, J. H. St. Cloud
Beaudoux, Henry A. Minneapolis
Beckley, F. L. St. Paul
Beebe, W. L. St. Cloud
Beiderman, Jacob. Thief River Falls
Beise, R. A. Brainerd
Bell, J. W. Minneapolis
Bell, J. W. Jr. Minneapolis
Belt, W. E. Dodge Center
Benedict, E. E. Minneapolis
Benedict, W. L. Rochester
Benepe, L. M. St. Paul
Benhan, E. W. Mankato
Benjamin, A. E. Minneapolis
Benn, F. G. Minneapolis
Bennion, P. H. St. Paul
Benot, T. F. Winona
Benson, Geo. E. Minneapolis
Benson, I. S. Willmar
Bentley, Norman P. St. Paul
Bergheim, M. C. Raymond
Bergh, L. N. Montevideo
Berquist, K. E. Duluth
Bertelson, O. L. Crookston
Berkman, D. M. Rochester
Berrisford, Paul D. St. Paul
Bessees, A. M. Minneapolis
Bessees, W. A. Minneapolis
Bettingen, J. W. St. Paul
Bigelow, C. E. Dodge Center
Binger, H. E. St. Paul
Binet, H. E. Grand Rapids
Birnborg, T. L. St. Paul
Bishop, Chas. W. Minneapolis
Bissell, Chas. W. Minneapolis
Bissell, W. W. Rochester
Black, Wm. Mankato
Blake, Jas. Hopkins
Blakely, C. C. Barnum
Blifus, W. T. Rochester
Blegen, H. M. Warren
Bock, R. A. St. Paul
Bockman, M. Minneapolis
Bockmann, Edward. St. Paul
Bockmann, Egil. St. Paul
Boehm, J. C. St. Cloud
Bohland, E. H. St. Paul
Bohland, F. J. Belle Plaine
Bohling, B. S. Sandstone
Bole, R. S. St. Paul
Boleyn, E. S. Stillwater
Bolles, D. W. Galveston, Texas
Bolsta, Chas. Ortonville
Bolstad, H. C. St. Paul
Bone, Merle. Kelliher
Booth, A. E. Minneapolis
Boquist, E. T. W. Minneapolis
Borren, C. A. Minneapolis
Borreson, B. Bemidji
Bosingham, O. N. Lake Benton
Bosworth, Robinson. St. Paul
Bottelison, B. I. Moorhead
Bouman, H. A. Minneapolis
Bowling, H. H. Rochester
Boyer, S. H. Duluth
Boyesen, P. Pelican Rapids
Bowers, J. T. Lake City
Bowers, H. E. Lake City
Brabec, F. J. Perham
Braden, A. J. Duluth
Branton, A. F. Willmar
Branton, B. J. Willmar
Branyan, Hugo. Wabasha
Bratrud, A. E. Minneapolis
Bratrud, O. Edward. Warren
Bratrud, Theodor. Warren
Brand, G. D. St. Paul
Bray, C. W. Biwabik
Bray, E. R. St. Paul
Brigham, C. F. St. Cloud
Brigham, Frank. Eden Valley
Brimhall, J. B. St. Paul
Broberg, J. A. Blue Earth
Broders, A. C. Rochester
Brodie, Walter D. St. Paul
Broker, W. S. Battle Lake
Brooks, Chas. N. Minneapolis
Brooks, D. F. St. Paul
Brooks, G. F. Minneapolis
Broosch, W. F. Rochester
Brown, A. H. Pipestone
Brown, Edgar D. Minneapolis
Brown, Ed. I. St. Paul
Brown, John C. St. Paul

Brown, LeRoy. St. Paul
Brown, Paul F. Minneapolis
Brown, R. S. Minneapolis
Brown, Silas E. St. Paul
Browning, W. E. Caledonia
Brunet, L. M. Cloquet
Buck, Fred. H. Shakopee
Buckley, E. W. St. Paul
Buie, L. A. Rochester
Bullen, F. W. Hibbing
Bumpus, H. C. Rochester
Burch, F. E. St. Paul
Burfiend, G. H. St. Paul
Burnap, W. L. Fergus Falls
Burns, F. W. St. Paul
Burns, H. D. Albert Lea
Burns, M. A. Milan
Burns, R. M. St. Paul
Buscher, H. St. Paul
Bushey, M. E. Arlington
Butler, John. Minneapolis
Button, A. J. Hackensack
Butturf, C. R. Freeborn
Butz, J. A. Monterey
Byrnes, W. J. Minneapolis

Cabot, V. S. Minneapolis
Caine, C. E. Morris
Caldwell, J. M. Brainerd
Calhoun, F. W. Albert Lea
Cameron, J. A. St. Paul
Camp, W. E. Minneapolis
Campbell, A. A. Ogema
Campbell, D. R. Bagley
Campbell, E. Paul. St. Paul
Campbell, J. E. South St. Paul
Campbell, L. M. Minneapolis
Cannady, E. E. Prior Lake
Cannon, C. N. St. Paul
Cannon, Harry. St. Paul
Carlson, C. M. Minneapolis
Carman, C. L. St. Paul
Carman, Paul I. St. Paul
Carroll, Wm. C. St. Paul
Carstons, C. F. Hibbing
Cattlin, John J. Buffalo
Catlin, T. J. Palisade
Cavanaugh, J. O. St. Paul
Cavanor, F. T. Minneapolis
Chadbourne, A. G. Heron Lake
Chambers, W. C. Blue Earth
Chamberlain, J. W. St. Paul
Chamberlain, W. A. Waseca
Chapman, T. L. Duluth
Chapman, W. E. Litchfield
Chatterton, C. C. St. Paul
Cheleen, S. J. Minneapolis
Cheney, E. L. Duluth
Christenson, C. R. Morris
Christensen, A. St. Paul
Christie, G. R. Long Prairie
Cirkler, A. A. Minneapolis
Clark, C. N. Greenbush
Clark, F. E. Duluth
Clark, G. E. Stillwater
Clark, H. B. St. Cloud
Clark, H. S. Minneapolis
Clark, Lenna E. Greenbush
Clark, T. C. Minneapolis
Clay, E. M. Renville
Clayden, L. E. Red Wing
Clement, J. B. Lester Prairie
Clifford, C. E. West Concord
Clifton, Geo. A. Isanti
Cobb, S. G. St. Paul
Cockrane, W. M. Minneapolis
Cole, H. B. Redwood Falls
Cole, Wallace H. St. Paul
Coleman, F. B. Austin
Collie, H. G. Brainerd
Collins, A. N. Duluth
Collins, H. C. Duluth
Collins, J. S. Caledonia
Colvin, A. R. St. Paul
Comstock, A. E. St. Paul
Condit, W. H. Minneapolis
Conheim, Eva. St. Paul
Conkey, C. D. Duluth
Conley, Alva A. Cannon Falls
Conley, H. E. Cannon Falls
Connor, C. E. St. Paul
Connor, H. M. Rochester
Cook, Paul B. St. Paul
Cooney, H. C. Princeton

Cooper, M. D. Winnebago City
Corbett, Frank J. Minneapolis
Cornlea, A. D. St. Paul
Corrigan, J. E. Spooner
Cory, W. H. Waterville
Cosgrove, J. H. Duluth
Cosman, E. O. Minneapolis
Cowen, E. W. North St. Paul
Courtney, Walter Brainerd
Covell, W. W. St. Peter
Coventry, W. A. Duluth
Covey, Herman Knoxville, Ia.
Cowing, P. G. Evansville
Craft, Leo M. Minneapolis
Craig, C. E. International Falls
Crandall, A. M. Madison
Cranmer, Richard R. Minneapolis
Cremner, M. H. Red Wing
Crenshaw, J. L. Rochester
Cress, P. J. Ellsworth
Crewe, J. E. Rochester
Cress, E. E. Boyd
Crowe, J. H. Virginia
Crume, Geo. P. Minneapolis
Cutts, G. A. C. Litchfield

Dahl, G. A. Mankato
Dahlstrom, A. W. Barrett
Dack, Lloyd G. St. Paul
Dahl, John A. Minneapolis
Daignault, O. Benson
Daily, W. J. Blooming Prairie
Dampier, C. E. Crookston
Daniels, J. W. St. Peter
Daniels, W. H. Crookston
Danielson, K. A. Litchfield
Darling, J. B. St. Paul
Darrow, D. C. Moorhead
Dart, Leslie O. Minneapolis
Daugherty, E. B. St. Paul
Daugherty, L. E. St. Paul
Davis, B. J. Duluth
Davis, Herbert St. Paul
Davis, F. U. Faribault
Davis, H. S. Duluth
Davis, William St. Paul
Davison, P. C. Willmar
DeBoer, Hermanus Edgerton
Dedolph, Karl St. Paul
Delmore, J. L. Roseau
Dempsey, D. P. Kellogg
Denman, A. V. Mankato
Dennis, W. A. St. Paul
Deslauriers, A. A. Duluth
Dewey, G. W. Fairmont
Deziel, G. Minneapolis
Dickson, Thos. H. Jr. St. Paul
Disen, C. F. M. Minneapolis
Ditmeyer, L. M. Gerber Jasper
Dittman, Geo. C. St. Paul
Dodge, F. A. Le Sueur
Dohm, A. J. St. Paul
Dolan, C. P. Worthington
Dolder, F. C. Eyota
Doms, H. C. Slayton
Donaldson, C. A. Minneapolis
Donovan, J. J. Litchfield
Doollittle, L. E. Duluth
Douglas, H. E. Blackduck
Doyle, John Willie Hill City
Doxey, G. L. Minneapolis
Drake, Carl B. St. Paul
Drake, C. R. Minneapolis
Drake, F. A. Lanesboro
Dredge, H. P. Sandstone
Drenning, F. C. Duluth
Driesbach, N. Minneapolis
Drought, W. W. Fergus Falls
Dryden, F. M. Crookston
DuBois, J. A. Sauk Center
DuBois, J. F. Sauk Center
Dudley, J. H. Windom
Dulude, S. Dassel
Dunlop, Alex. Crookston
Duncan, Henry Marietta
Dunn, J. N. St. Paul
Duclos, J. A. Henderson
Dunn, Louis Minneapolis
Dunsmoor, F. A. Minneapolis
Durgin, F. L. Nopeming

Earl, George A. St. Paul
Earl, Robert C. St. Paul
Eberlin, E. A. Glenwood
Eby, C. B. Spring Valley
Eckstein, A. W. Comfrey
Edmunds, I. L. Clearwater
Edwards, Ralph C. Elysian

Egan, John M. Minneapolis
Ehmke, Wm. E. Willow River
Ehrenberg, C. J. Willmar
Eisengraeben, G. A. Granite Falls
Eissenman, W. G. Chisholm
Eirley, Clara Mt. Pleasant, Ia.
Eitel, G. G. Minneapolis
Ekblad, J. W. Duluth
Eklund, J. J. Duluth
Eklund, Wm. J. Duluth
Elias, F. J. Duluth
Ellison, Frank E. Monticello
Ely, O. S. So. St. Paul
Engberg, E. J. St. Paul
Engl, Sigfred Cottonwood
Erb, F. A. Minneapolis
Erickson, J. G. Minneapolis
Ernest, G. C. St. Paul
Ertel, E. Q. Ellendale
Esheby, E. C. St. Paul
Esser, John Perham
Estrem, C. O. Fergus Falls
Eusterman, G. B. Rochester
Evarts, Arah B. Rochester
Evert, J. A. Brainerd
Ewing, C. F. Wheaton

Fahey, E. W. Duluth
Fansler, W. A. Minneapolis
Farmer, J. C. McKinley
Farr, R. E. Minneapolis
Farrish, R. C. Sherburn
Farrage, J. H. Winnebago City
Fawcett, C. E. Stewartville
Ferguson, J. B. St. Paul
Ferguson, J. C. St. Paul
Fields, Merton Northfield
Fisher, G. Minneapolis
Fischer, H. P. Shakopee
Fischer, O. F. Houston
Fischer, P. M. Shakopee
Fisher, L. F. Thief River Falls
Fitzgerald, E. T. Morris
Fjelstad, G. Alford Minneapolis
Fleischhauer, D. S. Wabasha
Flemming, A. S. Minneapolis
Flinn, T. E. Redwood Falls
Flemming, James Cloquet
Finn, B. P. Redwood Falls
Fogarty, Chas. W. St. Paul
Folken, F. G. Albert Lea
Flom, A. O. Chicago City
Flower, W. Z. Minneapolis
Forbes, R. S. Duluth
Forest, C. G. Clearbrook
Foster, Brainbridge Spring Valley
Freeman, C. D. St. Paul
Franchere, F. W. Lake Crystal
Franzen, H. G. Minneapolis
Freeborn, J. A. Fergus Falls
Freed, O. J. R. Kokato
Freeman, Geo. H. Willmar
Freeman, J. P. Glenville
Freeman, W. L. Foley
Freligh, E. O'B Stillwater
French, H. S. Grove City
Friesleben, Wm. Sauk Rapids
Fritsch, F. P. Gibbon
Froelich, H. W. Thief River Falls
Frost, E. H. Willmar
Frost, Harry T. Crookston
Fulton, J. F. St. Paul
Furber, W. W. Cottage Grove

Gaines, E. C. Buffalo Lake
Gamble, J. W. Rochester
Gardner, Edwin L. Minneapolis
Gates, J. A. Kenyon
Gauger, E. C. St. Paul
Gauthier, W. Virginia
Geer, Everett K. St. Paul
Geissenger, John D. St. Paul
Giesler, Paul W. Minneapolis
Geist, Emil S. Minneapolis
Geist, George A. St. Paul
Gelz, J. J. Richmond
Gendron, J. F. Grand Rapids
Germon, Chas. Balaton
Ghent, C. Harry St. Paul
Ghent, M. M. St. Paul
Ghostley, Mary C. International Falls
Gibbon, L. L. Lowry
Giffin, H. Z. Rochester
Gilbert, Geo. C. Hill City
Gilbert, John Carlton
Gilfillan, J. S. St. Paul
Gillespie, N. H. Duluth

Gillette, A. J. St. Paul
Gilkinson, A. J. Osakis
Gilmore, R. Bemidji
Ginsberg, Wm. St. Paul
Giroux, A. A. Duluth
Glycer, R. T. Brocton
Goehrs, H. W. St. Cloud
Goekerman, W. H. Rochester
Goldberg, M. L. Jasper
Goltz, E. V. St. Paul
Golden, C. M. Tyler
Goodman, C. F. Virginia
Gordon, Geo. J. Minneapolis
Gosslee, G. L. Moorhead
Gothan, C. L. St. Paul
Graham, C. Rochester
Graham, David Duluth
Graham, Robert Duluth
Graham, R. D. Duluth
Granger, C. T. Rochester
Granger, S. Booker Rochester
Graun, F. A. Duluth
Graves, C. Aitkin
Gratzek, Thos. St. Paul
Gray, C. E. Rush City
Gray, F. D. Marshall
Greely, L. Q. Duluth
Green, E. K. Minneapolis
Greene, Charles L. St. Paul
Griffin, P. J. Fertile
Grimmes, H. B. Madella
Grise, W. B. Austin
Groebner, Otto A. St. Paul
Ground, H. T. Virginia
Gruenhagen, Arnold P. St. Paul
Guilford, H. M. Minneapolis
Gulde, W. C. Minneapolis
Guillion, A. Albert Lea
Gumper, J. B. Becker
Gunderson, Harley J. Minneapolis
Gunderson, R. M. Lake Park
Gunz, A. N. Center City
Guyer, L. G. Waseca

Haberman, E. Osakis
Haessley, S. B. Faribault
Hagaman, Geo. K. St. Paul
Hagen, G. L. Minneapolis
Hagen, H. O. New Richland
Hagen, O. E. Butterfield
Hagen, O. J. Moorhead
Haggard, G. D. Minneapolis
Haight, G. H. Audubon
Haines, J. H. Stillwater
Hall, A. R. St. Paul
Hall, E. L. Tracy
Hall, J. M. Minneapolis
Hall, P. M. State Sanatorium
Hallberg, C. A. Rochester
Hallenbeck, D. F. Rochester
Hallowell, W. H. Minneapolis
Hamel, Arnold L. Minneapolis
Hamel, C. E. Minneapolis
Hamilton, A. S. Minneapolis
Hammes, E. M. St. Paul
Hammond, J. F. St. Paul
Hand, W. R. Elbow Lake
Haney, C. L. Duluth
Hanson, A. M. Faribault
Hanson, Erling Minneapolis
Hanson, H. J. New London
Hanson, Olga S. Minneapolis
Hare, E. R. Minneapolis
Harriman, L. Howard Lake
Harrington, C. D. Minneapolis
Harrison, E. E. West Concord
Hart, A. B. Owatonna
Hart, M. J. LeRoy
Hartman, H. R. Rochester
Hartung, H. A. Le Sueur
Hartzell, Thos. B. Minneapolis
Haskell, A. D. Alexandria
Haskins, John L. Morgan
Hathaway, S. J. St. Paul
Hauge, M. M. Clarkfield
Haugen, O. N. Fergus Falls
Haugen, O. N. Fergus Falls
Havens, John G. W. Austin
Haverfield, Addie K. Minneapolis
Hawkins, E. P. Montrose
Hawkins, V. J. St. Paul
Hayes, J. M. Rochester
Hayes, M. F. Nashwauk
Haynes, B. H. St. James
Head, G. D. Minneapolis
Heagerty, W. B. Mazeppa
Healy, R. F. Pierz
Heath, A. C. St. Paul
Hedback, A. E. Minneapolis

Hedblorn, C. A. Rochester
 Helm, Russell R. Minneapolis
 Hegge, C. A. Austin
 Hegge, O. H. Austin
 Helmark, J. H. Moorhead
 Helmark, O. E. Duluth
 Heise, W. F. C. Winona
 Helk, H. H. Minneapolis
 Helland, G. M. Spring Grove
 Helland, J. W. Spring Grove
 Hemstad, Warner. St. Cloud
 Henderson, A. G. Klester
 Henderson, M. S. Rochester
 Hengstler, W. H. St. Paul
 Henney, Wm. H. McIntosh
 Hendrickson, J. F. Minneapolis
 Henriksen, H. G. New Market
 Henry, C. E. Minneapolis
 Hensel, C. N. St. Paul
 Henstin, A. E. Le Roy
 Herrick Stanley E. Minneapolis
 Herrmann, Edgar T. St. Paul
 Hertel, G. E. Austin
 Hesselgrave, S. S. St. Paul
 Heseltine, Verner T. Taylors Falls
 Heyerdale, O. C. Rochester
 Hiebert, J. P. Minneapolis
 Higgins, J. H. Minneapolis
 Hilger, A. W. St. Paul
 Hilger, D. D. St. Paul
 Hilger, J. M. Iona
 Hilger, L. A. St. Paul
 Hill, Eleanor J. Minneapolis
 Hill, R. J. Minneapolis
 Hirschboeck, F. J. Duluth
 Hirschfeld, M. S. Duluth
 Hitchings, W. P. Lakefield
 Hobbs, C. A. Minneapolis
 Hoff, Alfred. St. Paul
 Hoff, Peder A. St. Paul
 Hoffman J. Hennings
 Holdale, A. D. Tracy
 Holland, A. S. Minneapolis
 Holt, E. E. Detroit
 Holcomb, J. T. St. Paul
 Holcomb, O. W. St. Paul
 Holl, P. M. Minneapolis
 Holdridge, Geo. Foley. Foley
 Hollands, W. W. Fisher
 Holmberg, L. J. Canby
 Holmes, W. B. Ada
 Holst, C. F. Little Falls
 Holst, J. B. Little Falls
 Holte, H. Crookston
 Hodapp, R. J. Madelia
 Hodge, S. V. Minneapolis
 Hodgson, H. H. Crookston
 Holbrook, J. H. Mankato
 Holm, P. F. Wells
 Holman, C. J. Mankato
 Hovde, Rolf. Winthrop
 Howard, S. E. Rochester
 Howard, W. S. St. Paul
 Howe, A. W. Minneapolis
 Hubert, R. L. Los Angeles
 Huenekena, E. J. Minneapolis
 Huffman, R. W. Elgin
 Hullsiek, H. E. St. Paul
 Humphrey, E. W. Moorhead
 Humphrey, W. R. Stillwater
 Hunt, H. E. St. Paul
 Hunt, F. N. Fairmont
 Hunt, R. C. Rochester
 Hunt, V. C. Rochester
 Hunt, W. A. Northfield
 Hunte, A. F. Truman
 Hursh, M. M. Grand Rapids
 Huxley, F. R. Fairbault
 Hvostel, Jacob. Minneapolis
 Hynes, John E. Minneapolis
 Ide, A. W. Brainerd
 Iden, B. F. Minneapolis
 Ikeda, Kano. Minneapolis
 Irvine, H. G. Minneapolis
 Jacobs, A. C. Elmore
 Jacobs, John C. Willmar
 Jacquot, G. L. Ivanhoe
 James, J. H. Mankato
 Jamieson, Earl. Walnut Grove
 Jarvis, Bruce W. Minneapolis
 Jellison, E. R. New Auburn
 Jenckes, H. D. Pipestone
 Jensen, M. J. Minneapolis
 Jensen, T. J. Duluth
 Jeson, J. W. St. Paul
 Jensen, J. C. Hendricks

Johnson, A. E. Red Wing
 Johnson, A. Elof. Minneapolis
 Johnson, Asa M. St. Paul
 Johnson, Carl E. Minneapolis
 Johnson, C. M. Dawson
 Johnson, E. W. Bemidji
 Johnson, Hartland C. St. Paul
 Johnson, H. M. Dawson
 Johnson, G. L. Newfolden
 Johnson, Hans. Kirkhoven
 Johnson, H. P. Fairmont
 Johnson, James A. Minneapolis
 Johnson, Julius. Minneapolis
 Johnson, Nimrod. Minneapolis
 Johnson, R. A. Minneapolis
 Johnson, T. H. St. Paul
 Josewich, Alexander. Minneapolis
 Jones, H. W. Minneapolis
 Jones, W. A. Minneapolis
 Jones, A. W. Red Wing
 Jones, E. M. St. Paul
 Joyce, S. T. Rochester
 Joyce, T. M. Janesville
 Judd, E. S. Rochester
 Judson, W. E. Duluth
 Just, A. A. Crookston
 Kabrick, O. A. Odin
 Kalinoff, D. Stillwater
 Kamp, B. A. Albert Lea
 Kanne, C. W. Fairbault
 Kannary, E. L. St. Paul
 Karn, E. R. Ortonville
 Keeling, F. L. Lakefield
 Kelly, B. W. Aitkin
 Kelly, John V. St. Paul
 Kelly, Paul H. St. Paul
 Kelsey, C. G. Hinckley
 Kemp, A. F. Mankato
 Kennedy, C. C. Minneapolis
 Kennedy, Jane F. Minneapolis
 Kennedy, R. Ray. Minneapolis
 Kenyon, Paul. Wadena
 Keisling, I. H. Nashwauk
 Kern, M. J. St. Cloud
 Kesting, Herman. St. Paul
 Keyes, C. R. Duluth
 Keyes, E. D. Winona
 Kibbe, O. A. Canton
 Kierland, P. E. Harmony
 Kilbourne, A. F. Rochester
 Kilbridge, J. S. Canby
 Kimball, H. H. Minneapolis
 King, E. A. Minneapolis
 King, Walter E. St. Paul
 King, C. P. Rochester
 King, W. S. Eveleth
 Kirk, G. P. East Grand Forks
 Kirms, Geo. W. Minneapolis
 Kirsch, R. L. Crookston
 Kirtrud, G. St. Paul
 Kistler, C. M. Minneapolis
 Kittelson, John A. St. Paul
 Kittelson, T. V. Fergus Falls
 Kjelland, J. S. Crookston
 Klein, Harry. Duluth
 Klein, H. N. St. Paul
 Knauff, M. K. St. Paul
 Knickerbocker, F. H. Staples
 Knight, H. L. Minneapolis
 Knight, Ray Roberts. Minneapolis
 Knudtson, H. M. Pipestone
 Koch, John Charles. Minneapolis
 Kohler, F. G. Hector
 Kohler, G. A. Minneapolis
 Koller, Herman M. Minneapolis
 Koller, L. R. Minneapolis
 Kolset, Carl D. Benson
 Kraft, Peter. Duluth
 Kramer, G. B. St. Paul
 Kran, N. D. Coleraine
 Kreimer, Walter J. Minneapolis
 Kuhlman, Aug. Melrose
 Laird, A. T. Nopeming
 LaJole, John M. Minneapolis
 Lande, W. B. St. Paul
 Kuth, J. R. Duluth
 Lane, Laura A. Fairbault
 Laney, R. L. Deer River
 Langenderfer, F. V. St. Paul
 Lannin, J. C. Mabel
 La Pierre, C. A. Minneapolis
 Larsen, C. L. St. Paul
 Larson, O. O. Detroit
 Laurent, A. A. Minneapolis
 La Vake, R. T. Minneapolis
 Iaw, A. A. Minneapolis
 Leach, W. D. Calaway

Leahy, Bartholomew. St. Paul
 Leavenworth, Richard O. St. Paul
 Leavitt, H. H. Minneapolis
 Leck, Clifford C. Austin
 Le Clerc, J. E. Le Sueur
 Lebowski, Joseph A. Minneapolis
 Lee, W. A. Fergus Falls
 Lee, Walter N. Madison
 Lee, W. P. Northfield
 Leibold, H. H. Parkers Prairie
 Leicht, O. Winona
 Leichtenstein, H. Winona
 Leigh, H. J. Lakefield
 Leitch, Archibald. St. Paul
 Leland, John T. Herman
 Leland, M. N. Minneapolis
 Lemon, W. S. Rochester
 Lenont, C. B. Virginia
 Lepak, F. J. Duluth
 Lepak, John A. St. Paul
 Lerche, William. St. Paul
 Lester, C. A. Winona
 Leuty, Amos. Morris
 Lewis, A. J. Henning
 Lewis, C. B. St. Cloud
 Lewis, Chas. T. Austin
 Lewis, E. J. Sauk Center
 Lewis, J. B. South St. Paul
 Lewis, J. D. Minneapolis
 Lewis, W. W. St. Paul
 Lexa, F. J. Lonsdale
 C. Louis Lick. St. Paul
 Lillie, H. T. Rochester
 Lillie, W. T. Rochester
 Lima, Ludwig. Montevideo
 Lind, C. J. Minneapolis
 Linde, Herman. Cyrus
 Lindsay, W. V. Winona
 Lindgren, E. T. Duluth
 Linneman, N. L. Duluth
 Linner, H. P. Minneapolis
 Linstrom, Jarl. Minneapolis
 Linton, W. B. Rochester
 Litchfield, John T. Minneapolis
 Little, W. J. St. Paul
 Litzenberg, J. C. Minneapolis
 Lloyd, H. J. Mankato
 Logan, A. H. Rochester
 Logan, F. W. Blue Earth
 Logefell, Rudolph C. Minneapolis
 Lokken, O. E. Crookston
 Lommen, A. P. Lanesboro
 Lommen, P. A. Austin
 Loomis, E. A. Minneapolis
 Lowe, L. M. Glyndon
 Lowe, Thos. Pipestone
 Lowe, Thos. A. Pipestone
 Love, Fred A. Carlos
 Love, Geo. A. Preston
 Ludloff, A. G. Mankato
 Luedtke, G. H. Fairmont
 Lufkin, H. M. St. Paul
 Lum, C. E. Duluth
 Lundgren, A. C. Minneapolis
 Lynam, Frank. Duluth
 Lynch, J. L. Winona
 Lynch, M. J. Minneapolis
 Lyng, John. Minneapolis
 Lynn, J. F. Waseca
 Lyon, H. R. Rochester
 Lyon, J. D. Minneapolis
 Lyzne, Henry. Minneapolis
 MacDonald, D. A. Minneapolis
 MacLaren, Archibald. St. Paul
 McCann, D. F. Bemidji
 McCarthy, W. J. Madelia
 McCarthy, W. R. St. Paul
 McClanahan, J. H. White Bear
 McClanahan, T. S. White Bear
 McCloud, C. N. St. Paul
 McComb, C. F. Duluth
 McCormick, Thos. F. St. Paul
 McCrea, James. Fulda
 McCuen, J. A. Duluth
 McDaniel, Orianna. Minneapolis
 McDavitt, Thos. St. Paul
 McDermott, T. E. Minneapolis
 McDonald, A. L. Duluth
 McDonald, H. N. Minneapolis
 McDonald, Irving C. Minneapolis
 McDougald, D. W. Le Sueur
 McDowell, J. P. St. Cloud
 McEachran, A. Minneapolis
 McGehre, E. C. Hibbing
 McGiffery, E. N. Duluth
 McGroarty, J. J. Easton
 McGuigan, H. P. Red Wing
 McHugh, Roderick F. Aitkin

McIntire, H. M. Waseca
 McIntyre, Geo. Minneapolis
 McIntyre, John A. Round Lake
 McKeon, Owen. St. Paul
 McKenna, J. C. Austin
 McKibben, N. E. St. Cloud
 McKeown, E. G. Pipestone
 McKinney, F. S. Minneapolis
 McLaren, Jennette M. St. Paul
 McLaughlin, E. M. Winona
 McLaughlin, Jos. A. Minneapolis
 McNevin, C. F. St. Paul
 McPheeters, H. O. Minneapolis
 Macnie, J. S. Minneapolis
 Maercklein, I. R. Renville
 Maetz, W. F. New Prague
 Magie, H. W. Duluth
 Magnusson, Herman V. Bell, Calif.
 Maloney, T. J. St. Paul
 Mann, A. T. Minneapolis
 Manson, F. M. Worthington
 Marclay, W. J. Minneapolis
 Marcum, E. H. Bemidji
 Mariette, Ernest. Hopkins
 Mark, Arthur E. St. Paul
 Mark, D. B. Minneapolis
 Martineau, J. L. St. Paul
 Masson, J. C. Rochester
 Martin, Edw. T. Marble
 Martin, T. R. Duluth
 Mastin, E. Y. Rochester
 Matthews, Justus. Minneapolis
 Mattick, Walter. Wauwatosa, Wis.
 Maurer, E. L. Brownton
 May, C. C. Adrian
 May, C. E. Minneapolis
 Mayo, C. H. Rochester
 Mayo, W. J. Rochester
 Mayland, M. L. Faribault
 Mead, Marion. Minneapolis
 Meckstroth, C. W. Brandon
 Mee, P. H. Osseo
 Meierding, Wm. A. Springfield
 Mellicke, W. W. Nicollet
 Meland, O. N. Warren
 Melby, Benedict. Blooming Prairie
 Melby, O. F. Thief River Falls
 Melzer, E. G. Lyle
 Merkert, G. L. Minneapolis
 Merrill, J. E. Amboy
 Merriman, L. L. Duluth
 Merritt, G. F. St. Peter
 Metcalf, F. W. Fulda
 Metcalf, James N. Monticello
 Meaker, G. H. Olivia
 Meyer, E. L. Minneapolis
 Meyerding, E. A. St. Paul
 Meyerding, H. W. Rochester
 Michael, J. C. Minneapolis
 Mieghe, J. W. Ulen
 Milan, M. Geo. Thief River Falls
 Miller, H. A. Waseca
 Miller, V. I. Mankato
 Miller, W. A. New York Mills
 Millsbaugh, J. G. Little Falls
 Mingo, F. E. Hugo
 Mitchell, Fredk. St. Paul
 Mitchell, R. S. Grand Meadow
 Moffatt, A. G. Howard Lake
 Mogilner, S. N. St. Paul
 Moir, Wm. W. Minneapolis
 Molander, H. A. St. Paul
 Molony, G. R. Belle Plaine
 Molzahn, Herman E. St. Paul
 Monahan, J. A. Minneapolis
 Monahan, R. H. Minneapolis
 Moore, A. B. Rochester
 Moore, W. J. Adams
 Moorhead, M. B. Minneapolis
 More, C. W. Eveleth
 Morehouse, G. G. Owatonna
 Moren, E. Minneapolis
 Mork, B. O. Worthington
 Morrell, W. N. Verndale
 Morley, G. A. Crookston
 Morris, E. H. Austin
 Morris, R. E. Minneapolis
 Morrison, A. W. Minneapolis
 Morrissey, F. B. St. Paul
 Morse, John. Minneapolis
 Morse, M. P. LeRoy
 Morse, W. E. H. Morrisston
 Morsman, L. W. Hibbing
 Morss, C. R. Coleraine
 Mortenson, N. G. St. Paul
 Moynihan, A. F. Sauk Center
 Moynihan, T. J. St. Paul
 Muehl, G. F. Rochester

Mulder, John L. Chaska
 Murdock, H. G. Taylors Falls
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ORIGINAL ARTICLES

CHOLECYSTECTOMY WITH MODIFIED DRAINAGE*

By CHARLES H. MAYO, M. D.
Rochester, Minn.

A problem which frequently confronts the surgeon in operations for gallstones, and for cholecystitis, with or without stones, is whether to close, drain, or remove the gallbladder. In the eventful evolution of surgery during the last thirty years notable progress has been made in surgery of the gallbladder. Progress has been made of course in all surgery of the upper abdomen which in early years was practiced to conserve life; operations of necessity were the rule for obstruction, acute pain, and infection in advanced stages of disease. In the lower abdomen the surgery has been largely that of sacrifice in dealing with infection in organs of reproduction or with unessential structures such as the appendix.

Operative indications in the upper abdomen in the early period of antiseptic surgery involved a high mortality, especially in diseases of the gallbladder. It was soon recognized that the danger lurked in the complications such as abscess of the liver, pancreatitis with fat necrosis, perforating gallbladder, and jaundice. Practically a vicious circle was developed by a late operation which resulted in high mortality, and the high mortality lead to dangerous delay. The gallstones which were essential to early operative procedures on the gallbladder, although often a cause of obstruction with secondary complications, lost their role as a primary entity in disease and cholecystitis became accepted as the primary condition. This is demonstrated by the Clinic records for the

year 1919 when 1254 patients were operated on for cholelithiasis and cholecystitis, 714 (61 per cent) of whom had stones; the operative mortality was 2.2 per cent. Cholecystitis without stones with changes in the mucous membrane of the gallbladder caused papillomas, degenerative processes, and the so-called strawberry and fish-scale types in 490 patients (39 per cent). The operative mortality in these was 2.4 per cent.

In 1886 Galippe first suggested bacteria as a causative factor in gallstones. Gilbert, in 1898, followed with practical demonstrations of infected gallbladders and stones, and in the same year Welch demonstrated bacteria in gallstones. Later investigators have found bacteria in the bile of the gallbladder and studied the infections with cholecystitis, even producing gallstone crystals in the mucous membrane. The routes of the infection ordinarily accepted were based on the theory that the bile primarily was infected; this could occur, first, through the portal circulation, the bacteria not having been destroyed in passing through the liver, second, through the lymphatic system by retrograde movement, and, third, through the common and cystic ducts from the intestine.

The opening of the gallduct, which also delivers the pancreatic secretion, is usually located beneath an over-hanging fold of mucous membrane in the duodenum and is thereby well protected. The little terminal opening is surrounded by the muscle ring of Oddi which keeps it closed and which should serve to equalize the tension of bile in the ducts and gallbladder as opposed to the hepatic circulation producing it. The sphincter of Oddi is stronger in animals that have gallbladders than in those without them, according to Mann." The gallbladder in health has a capacity for temporary storage of several ounces of bile, and rhythmic contractions stimulated by the contents of the gallbladder and ducts occur, causing such delivery

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as is common to the ducts, the ureters, and the small intestine. Their contraction readily overcomes this muscularly closed outlet, and the peculiar manner in which nature delivers a duct into a viscus by passing it partly through the wall, then continuing between the outer wall and the mucous membrane, so that internal pressure closes by compression from within but does not interfere with peristaltic delivery through the duct, is true of the common duct; under normal conditions it prevents back flow. This also is true of the little ducts delivering from the lobules of the pancreas into the main pancreatic ducts, not directly at right angles, but on a slant so that internal pressure tends to close them, undoubtedly a provision of nature to prevent the possible irritative effects of chemically changed bile in obstruction from entering the small pancreatic ducts.

Rosenow's investigations were based on the theory that the infection is carried through the blood stream, even in the tissues closely associated in function or connected by ducts, in other words, the specificity of localization of bacteria, which is now commonly accepted. It is probable that the chemical effects of bacteria and stasis of the gallbladder cause the development of stones, the materials for which are taken from the blood stream, although it must be admitted that the same materials are also present in bile.

Specific destruction of tissues by toxic agents has long been known; recent experiments of Mann¹¹ are most illuminating in showing the chemical effects of nontoxic drugs acting through the blood stream, being wholly selective in their effects on the gallbladder. Mann has shown that Carrel-Dakin solution injected intravenously into dogs in amounts from 5 c.c. to 10 c.c. to each kilogram, produces selective changes in the circulation of the gallbladder and destruction of that viscus, varying according to the quantity of solution used.

The increased cholesterol content of blood during pregnancy undoubtedly contributes to the higher percentage of women affected by cholecystitis with stones; the ratio is about 77 per cent in females to 23 per cent in males. Approximately 90 per cent of the women have borne children and have had the first attack

in close relation to a pregnancy. It is of interest to note that cholecystitis without stones occurs in women twice as often as in men.

Is it probable that cholecystitis can be cured by temporary drainage? Years ago before we began freely to employ cholecystectomy as a definite surgical procedure we found that it was not generally possible to cure cases of cholecystitis without stones, although we then were draining gallbladders without marked evidence of cholecystitis after the removal of stones. The removal of stones removed the cause of acute colics but the patients were frequently left with the reflex gastric symptoms evident before operation, which were attributed to dyspepsia, but which we now recognize as being caused by cholecystitis. We further found that drainage, which gives only temporary relief, left the fundus of the gallbladder fixed to the abdominal wall and frequently added to the impairment of function and often still further increased the suffering of the patients for varying periods. I believe, however, that it is a debatable question whether some of the milder cases of cholecystitis should not be considered medical instead of surgical.

A general knowledge of the pancreas and its diseases is very essential in the diagnosis of the diseases of the upper abdomen. In the majority of instances the condition of the pancreas, even in tumor formation, is overlooked unless the changes are gross, and mild derangements of function are often attributed to obstruction or disease of the liver. To be sure the condition of the pancreas is usually secondary to an infection involving the structure of the gallbladder, and although the infection may be brought through the continuity of tissues involved, through the duct itself, or through the lymphatics surrounding it, experimental evidence indicates that the pancreas too is probably more commonly affected through the blood stream. Of the 1254 patients seen at the Clinic with gallstones and cholecystitis during the last year 339 showed changes in the pancreas so marked as to be recognized clinically.

A consideration of the grosser pancreatic changes, with jaundice due to duct obstruction, increases the interest of a discussion as to whether the treatment in some cases of usually

distended gallbladder shall be removal, drainage, cholecystectomy, or cholecystostomy. In certain cases in which there is marked cholecystitis with or without stones cholecystostomy with drainage for many weeks or several months may be indicated to relieve the patient of a pancreatitis. If the gallbladder is preserved a relapse may be relieved by cholecystenterostomy or cholecystgastrostomy to furnish a new route of bile delivery, operations often performed in cancer of the pancreas accompanied by jaundice. In such cases the distended gallbladder does not show disease. Since the common duct often takes up its work intermittently, however, the fistula tends to close; to prevent this, the common duct should be closed, thus insuring permanency of the fistula.

From 1907 to 1920 we operated on 158 patients with cancer of the gallbladder. Previous to 1910 the ordinary operation was a cholecystostomy for cholecystitis with and without stones. During this time 350 cholecystectomies were performed, 3 per cent of which (0.82 per cent of the total number of operations on the gallbladder and duct) were for cancer, cholecystectomy being performed only in cases of advanced disease. Increased ability to diagnose cholecystitis and gallstones has led to a greatly increased number of early operations. Eleven thousand, four hundred twenty-nine operations on the gallbladder were performed from January, 1907

to August, 1920; of these 7,688 were cholecystectomies, but since the percentage of early operations before gross disease develops has increased greatly since 1910 the percentage of cancer found has been greatly reduced.

Cholecystostomy is now reserved for the special case in which advanced age or complications make it desirable; 3346 cholecystostomies



Fig. 1. Gallbladder freed from the liver on the left side; cystic duct ready to be divided between forceps.



Fig. 2. Gallbladder freed on the left side, and the duct divided. Dissection to be continued along dotted line.

have been performed at the Clinic from January, 1907 to August, 1920. Cholecystectomy with local peritoneal drainage has been the rule, but it is now used for gross infections, without biliary drainage, although biliary drainage is still provided for in most cases of common duct disease, closure being made in suitable cases without biliary drainage but with peritoneal drainage.

In an investigation by Dr. Judd and Dr. Har-

rington of 2027 operations on the gallbladder and ducts performed at the Mayo Clinic in 1917 and 1918 it was shown that 219, nearly 11 per cent, were secondary. In 109 of these calculi were found in the gallbladder or ducts, or in both. The primary operation had been performed at the Mayo Clinic in but sixty-four of the 219 (2.09 per cent). Some secondary operations are unavoidable. For instance, in our experience fresh soft stones have reformed three times in the common duct of the same patient and in a small percentage of cases stones had formed primarily in the hepatic ducts. We believe this great reduction in secondary operations in the Clinic has come from the general practice of cholecystectomy. Deaver has stated that 65 per cent of the secondary operations are due to failure to remove the gallbladder, and in a recent paper Jacobson, reporting 397 cases of gallbladder disease, gives the percentage of secondary operations as 4.2 per cent. If no gallstones are felt the whitening and thickening of the gallbladder wall is of some value in detecting cholecystitis during exploration. The question of adhesions must be weighed carefully in order to decide whether they are produced by the inflamed wall of

the gallbladder or by perforating ulcer of the stomach or duodenum; sometimes both conditions are present in the same person. The appearance of local cirrhosis of the liver, shown by White and contracted areas back of the attachment of the gallbladder, is of value as an indication of bacterial invasion, yet it must be admitted that the appearance of the gallbladder and liver may be perfectly normal in some

cases of stone and of extensive degeneration of the mucous membrane.

The palpable evidence of enlargement of the glands on the ducts, of which there is normally one on each duct and often two, is of the greatest importance. The one on the common duct next to the pancreas is often swollen in connection with duodenal ulcer as well as with pancreatitis, yet pancreatitis most frequently accompanies cholecystitis. The surgeon always should take advantage of his opportunity, when the abdomen is open, to examine these glands with a finger through the foramen of Winslow and a thumb over the ducts. By palpating the glands he may learn their normal condition, and thus be conscious of any changes.

In cholecystectomy a right oblique incision is made. I prefer to slant gradually through the vertical lines of muscle fibers, so that a firmer union of continuously divided muscle may be secured than by a split muscle incision; however, there are many incisions which will serve. Occasionally a gallbladder is placed deep beneath the liver and under its costal margin. Then the liver may be forced toward the midline by packing a large gauze square over the top and to the right of the organ. This maneuver of Masson brings the gallbladder directly into the exposed field and greatly facilitates the operation. Large distended and necessarily obstructive gallbladders are at times emptied by a trocar, and in acute inflammations may then be split from top to bottom. The mucous membrane in such conditions readily peels from the connective tissue on the surface of the liver. Bleeding is usually very slight; if it is at all sharp the separation has gone unnecessarily deep beneath the connective tissue on to the liver; the bleeding may be controlled by a temporary hot pack. The anterior surface of the gallbladder is completely cut away and the duct closed by suture. As a rule gallbladders are removed intact without being opened. The cystic duct is isolated, clamped between two forceps and divided, the cut ends of the duct exposed being touched with tincture of iodine and double ligated (Fig. 1). The cystic artery is then caught and ligated (Fig. 2). The distal end of the cystic duct is drawn up and with blunt pointed dissecting scissors the

gallbladder is separated from the liver from below upward. This procedure prevents, to a great extent, the possibility of injury of the common or hepatic duct. The greatest danger, however, is accidental division and loss of the cystic artery during operation. Variations in the ducts and in the origin of the cystic artery lead to such accidents. The papers of Brewer, Ruge, Gosset, and Eisendrath^{3,4} describing such variations are well worthy of perusal. The surface peritoneum of the gallbladder which is left at its attachment to the liver furnishes an easily sutured field. An interlocking catgut suture closes the raw surface down to the ligated cystic duct. The needle with suture is

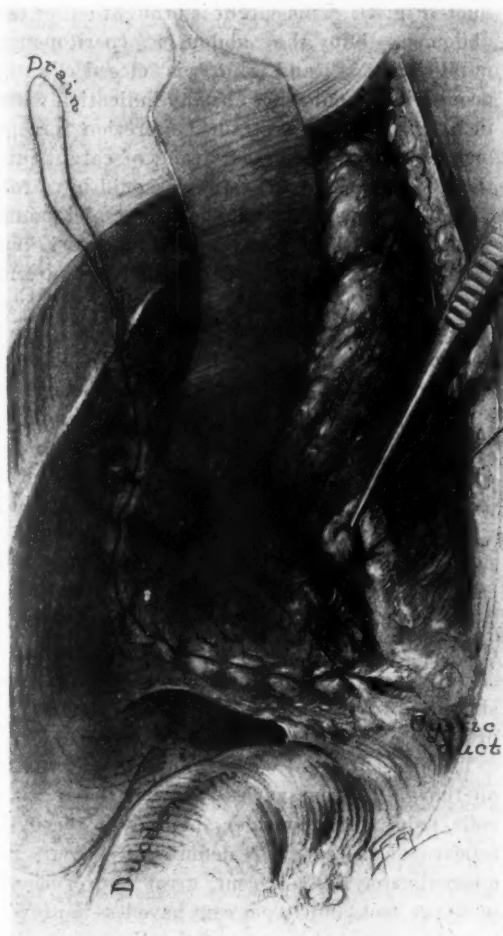


Fig. 3. Buttonhole suture of catgut placed; stump of cystic duct ready to be buried.

now passed alternately into the right border of the gastrocolic omentum and the right border of the gastrohepatic omentum with an occasional catch into the fatty round ligament to include it in the suture. This fatty apron shuts the stomach, pylorus, and duodenum off from possible fixation to the liver through adhesive attachment. If drainage is indicated it is between the liver and the fat and not between the liver and the pylorus. More and more I am closing the abdomen without drainage, in only a few instances satisfying my old inclination to drain by leaving the double strand of catgut attached to the liver, where the gallbladder fundus was separated from it, and continued in a suture down to the cystic duct (Fig. 3). This catgut is brought out of the abdomen, but the abdomen (peritoneum, muscle, fascia, and skin) is closed tightly around it. Should there be any indication within a few days of a retained secretion forceps may be passed along the strand of catgut into the abdomen, as any drainage would have followed the catgut suture line to the abdominal wall. If by the fourth day the catgut is not required it is placed under slight tension and cut beneath the skin. This method of cholecystectomy with complete closure of the abdomen has reduced very largely the danger of hernia which was not infrequent in the old days of drainage, whether of bile or peritoneal exudate.

Failure to cure may be due to age or to associated disease. Therefore a careful general examination is required before operation; and with the abdomen open exploration should be made to determine the presence of other disease. The appendix may be the original focus. A diseased pancreas may be the cause of future colic, even after the gallbladder is removed; consequently the condition of the pancreas should always be stated in the operative records.

The percentage of cures following operations on the gallbladder varies; some patients with colic from stone consider themselves cured if relieved of the colic. A definite cure occurs in approximately 60 per cent, great improvement in 30 per cent, and 10 per cent have less improvement because of the extent of the disease or complications.

In conclusion I would say that the diseased

gallbladder should be treated by cholecystectomy as a rule, its drainage being required under special conditions, that abdominal biliary drainage is not indicated except in complications, and that abdominal drainage is indicated only in conditions in which it would be used in the surgical treatment of other abdominal disease in which infection is present or has been present.

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DISCUSSION

DR. ARCHIBALD MACLAREN, St. Paul: This very remarkable and thoro presentation of the whole subject of gall-bladder surgery has interested us very

much. In looking up this subject, I was quite surprised to find that Mayo-Robson, in a work that was written very recently, reports that in 3000 cases of his own, the return of stones after cholecystotomy was very small. This interested me very much, so taking the first 150 cases of my own, where sufficient length of time had elapsed, and following them down, to see what percentage of returns were present, in this number of cholecystotomies, who came to me with further complaint, I found there were just 4 per cent of return of stones where simple drainage of the gall-bladder was used. Of course I do not know how many there were who did not return to me for care, or how many consulted some other surgeon. My records show, however, that the most of these patients have been absolutely cured, for a period of many years.

The most important problem to me, is, in what class of cases shall we remove the gall-bladder? And in what class of cases shall we just open and drain?

Some of my surgical friends, say, that they remove the gall-bladder in every case. I would like to do this, because I feel better satisfied when the gall-bladder is out, and during the last two years I have removed three-fourths of the gall-bladders that I have operated upon. But there is a class of gall-bladders that I feel sure, should not be removed; these are the most acute inflammatory gall-bladders, with particular emphasis on the ones in which perforation has occurred. If you have a perforation, usually you also have an acute inflammatory condition, similar to an abscess formation of the appendix. We all know the result if we try to do too much with an acutely inflamed appendix, the results under like condition of the gall-bladder are identical. I know by experience. I do not know whether my experience in this is different from the average, but it has been sufficient to convince me, of the desirability of not removing the gall-bladder under these conditions.

When you remove a gangrenous gall-bladder, you leave under the liver a raw surface about the size of your hand, unprotected by peritoneum. You can do a great deal in the abdominal cavity, if you leave the peritoneum alone, but the minute you take off a piece of the peritoneum and expose the cellular tissue of the abdominal wall or intra-peritoneal organs, take care, for the patient, if peritonitis develops is almost sure to die, according to our experience.

DR. JOHN T. ROGERS, St. Paul: I would like to hear Dr. Mayo elaborate a little on the subject of just what class of cases should be drained with his catgut suture. I would like to hear a little more on that subject. I am familiar with the Eisendrath literature on the subject, but I am not so clear in my own mind that in the cases of gall-stones with complications or the cases of cholecystitis with marked thickening of the gall-bladder or with common duct infection, I am ready to accept the dictum

of no drainage or even catgut drainage. The peritoneum does not stand the irritation of bile, especially of infected bile. I always feel a good deal safer when I put in at least a little cigarette drain, perhaps not down to the cystic duct, as is so commonly done, but at least through the abdominal wall.

The evolution of gall-bladder surgery has been, perhaps, the most satisfactory of any in general surgery. The time was not many years ago when we were constantly seeing and operating on recurrent gall-bladders. I mean by that the gall-bladders that had been drained and that came back for a second operation. I cannot tell you the percentage of my cases, because I think most of them go to Dr. Mayo or to some other surgeon—the cases I have drained in the past, but for many years I have removed the gall-bladder in every case where the patient's condition was such that I dared to go on with the cholecystectomy. In such cases as Dr. MacLaren describes I think those are the very cases in which I would remove the gall-bladder. I doubt if the raw surface remaining after splitting the gall-bladder and removing the mucous membrane is an atrium for the spread of infection. Nature takes care of such raw surfaces in a very short time.

Now the cases that I do not drain are rare, but I have a case every once in a while where the gall-bladder is pendulous and movable, with few adhesions, and filled with gall-stones, and perhaps can be easily removed; there is no thickening of the ducts, the common duct is not thickened, I can tie off the cystic duct and remove such a gall-bladder and I would feel safe in not draining it, but those rare cases.

There is another class of cases that Dr. Mayo spoke of, which I see rarely, the so-called "strawberry" gall-bladder. That there is such a thing, there is, of course, no doubt, but I have an idea that the great majority of mistakes in diagnosis of gall-bladder disease where the gall-bladder has been removed merely because of some inflammation in the mucous membrane of that gallbladder, are the cases that I would close up without drainage, even a cigarette drain. In those cases in which there is marked pathology I am still unconvinced that complete closure of the abdomen is the proper thing in gall-bladder surgery and especially in those cases that have a pancreatic infection. I believe that drainage should be prolonged either through the common duct or, in rare instances, in drainage through the gall-bladder, but I would like to hear more from Dr. Mayo as to just what class of cases he is closing without drainage.

DR. JOSEPH A. BLAKE, New York City: I did not come prepared to discuss this subject. I have not had much gall-bladder experience in the last few years, but in regard to the question of drainage and the question of removal, it all comes down, it seems to me, to a matter of common sense. How much should be done and what should be left, all this de-

pendes largely upon the condition of the patient. Now I should just like to tell a story illustrating this, of two patients who were operated on in New York last year. I heard this directly from the family physician who was present. These men were two parallel cases, excepting that one had diabetes. Both were 55 years old and both had acute abdomens from a perforated gangrenous appendix. One surgeon came in, sat down on the edge of the bed, took out a pair of scissors and artery clamp from his pocket, opened the abdomen with the scissors, put in the artery clamp, pulled out the appendix, cut it off with the scissors, left the artery clamp in the belly, and put on a dressing,—and by the way this was the man who had the diabetes. It only took a minute to do it, there was no traumatism, merely a little hole. He said to the family physician, "You can change that dressing tomorrow." The physician asked, "Are you not coming back?" "No, you can take care of the case." "What will I do with that clamp?" "Oh! that will come out in a few days", which it did and the man got well.

The other man was perfectly strong; he was given an anesthetic, a large incision made, the appendix removed, the base carefully inverted, the peritoneum sewed over the mucous membrane, and then a complete toilet of the abdomen was done with gauze all through and drains inserted, and the man naturally died the next day.

Those cases interested me very much and they are very instructive. In the acute abdomen if we can relieve the patient it is much better to do that and get out. In those cases the appendix was removed. I always believe in removing the offending organ or the source of infection when you can. In gangrenous gall-bladders it is very easy to make an incision under local anesthesia, relieve the patient, and afterwards do a cholecystectomy, because this does not amount to much.

This is hardly a discussion of Dr. Mayo's point, it is a little bit on the side. I thought that his points were exceptionally well made in regard to the removal of the gall-bladder, particularly in regard to the closure afterwards and keeping the stomach, pylorus and duodenum away from adhesions to the abdominal wall. It seems to me that is a very valuable thing when sufficient time can be taken and it can in nearly all of these cases.

DR. W. H. MAGIE, Duluth: This is a very interesting subject and I am very glad to hear this discussion. It seems to me that Dr. Mayo or any other surgeon cannot lay down a definite rule of drainage in a gall-bladder or in any other case. We surgeons come to these meetings for the purpose of discussing these subjects and get the view points of others upon these subjects. I think the responsibility rests not with Dr. Mayo in my case, but the responsibility rests with Dr. Magie in any given case as to whether he is going to drain that case. It is useless for us to try to lay down a rule that is going to be ap-

plicable to all gall-bladder surgery. That is why God Almighty has given us brains and he expects us to make use of them. We must discuss these subjects and settle them to our own satisfaction, according to the convictions we have received from experience we have had, though it may not be so great as the experience of some other surgeon, but the responsibility however rests upon us and our decision must be made at the operation table. I do not think there is any hard or fast rule that can be laid down as to the whether we should do a cholecystectomy or whether we should drain after a cholecystectomy has been performed. This question must be decided at the operating table.

DR. M. M. GHENT, St. Paul: When one listens to an artist like Dr. Mayo describing his removal of the gall-bladder, beginning at the lower end, it is very convincing, but for the occasional operator, I think that many times this work can be done easier starting at the fundus. Now gall-bladder surgery for me is very serious and it does not always show up the operative field as plainly as Dr. Mayo's pictures do. For myself, and I think for other operators who are not so clever with their hands, it is better to begin at the fundus of the gall-bladder. Teaching surgery is a good deal like a golf coach teaching golf. The coach may be the best player in the world and his strokes may be perfectly sound for him, but when he begins to try to teach them to the average players, he will find he never can make a golf champion out of them. For one who does not do a great deal of gall-bladder surgery, the gall-bladder can be taken out more safely beginning at the fundus.

DR. C. M. ROAN, Minneapolis: In this question of gall-bladder drainage and extirpation I feel that mention should be made of gall-bladder lavage such as I had the good fortune of seeing practised by Dr. Wessel of the Community Hospital, Copenhagen, a year ago this month. In selected cases Dr. Wessel opens the gall-bladder, removes the stones in the usual manner and follows this with a mild antiseptic lavage at body temperature. He thereupon closes the gall-bladder with silk sutures by inverting the edges. The abdomen is closed without drainage. This method Dr. Wessel had used for a period of three years, particularly in cases where there was no involvement of the pancreas and where there were no stones in the common duct. While I have not seen any report as yet in the literature on his work, he stated that he had had uniformly good results.

DR. C. H. MAYO (closing): Years ago in a discussion of the diagnosis and operative treatment of gall-bladder diseases I referred to the subject of quantitative and qualitative food dyspepsia in gall-bladder disease. Qualitative dyspepsia comes on within thirty minutes after eating. It is a reflex disturbance in the stomach when due to the gall-bladder disease, whether or not there are stones. Some type of spasm of the muscle of Oddi may possibly be the cause. It is stated that if the Einhorn

tube is passed from the stomach into the duodenum and a little sulphate of magnesia given through the tube, it will start a flow of bile. This has been developed by Meltzer and by Lyons. The cause of real trouble in the upper duodenum and stomach is ulcer or cancer of the stomach; other disturbances are reflexes from diseases of the nervous system, gall-bladder, pancreas, appendix. Most of the time the patients deny that foods disagree with them. Do not suggest to them that they have trouble with food of certain types, but say, "You have no trouble in eating raw apples, uncooked vegetables, salads, greasy and fried foods?" At least 90 per cent of patients with cholecystitis will say that they cannot eat these things. Quantitative food dyspepsia is caused by disturbance of the peristaltic action, usually one hour after eating, never within thirty minutes unless there is an obstruction high up, which may be due to gallbladder disease or neoplasm.

Before we attempt to cure gallstones their cause must be removed. Lipoid changes tend to produce gallbladder diseases. Such changes are found in the strawberry gallbladder and the fish scale gallbladder. Are we doing any better gallbladder surgery today than we did thirty years ago? Are we having the same mortality rate that we had thirty years ago? Are we adding any cholecystitis cases to this group? Thirty-eight plus per cent of cases of cholecystitis are without stones. All the cases of gallstones are associated with cholecystitis and gallstones reform in the gallbladder.

Years ago in cases of appendicitis we operated only after abscess had formed. Gradually we began to operate during intervals and we employed drainage even in clean cases because we were accustomed to drainage. Then we stopped drainage and the results improved. We have eliminated drainage in the pelvis, whereas we formerly employed it in every case of pus tubes. Fifteen years ago if a man, said, "I am closing the pelvis without drainage", we were convinced that he was taking a great chance. We have made marked advances. We should study our advances and see if they make any difference in the results.

I used to consider dissection of the gallbladder from the fundus to the neck a very complete operation, yet if dissection is started at the bottom one artery only needs to be dealt with. Occasionally a big gallbladder is in the way, but it may be drained with a trocar. Adhesions are annoying, but they can be freed. If a patient is very sick only the obstruction should be relieved and drainage instituted secondarily. In the Clinic we drain in most cases of stone in the common duct and in all cases we drain the peritoneum. Ten years ago we would not think of closing the abdomen without drainage in a case of diseased gallbladder. The results of no drainage, unless indicated, are good. Today we take out gallbladders. I have operated again and again in my own cases in which stones recurred after drainage.

A month ago I operated on a patient eleven years after we first removed the stones. All of them do not come back to us; some of them go to others. Jacobson found in his own clinic 4 to 6 per cent of recurrences in cases of stone in which the gallbladder had been saved. We cut our percentage of recurrences from 9 to 14 per cent down to slightly more than 2 per cent, when we began to remove gall-bladders for disease.

PERITONITIS AND INTESTINAL INTUBATION*

By ARTHUR N. COLLINS, A. B., M. D., F. A. C. S.
Duluth, Minn.

In well defined diffuse peritonitis, there are clinical signs of intestinal obstruction. In well defined intestinal obstruction, we look for death to ensue, if the obstruction is allowed to remain unrelieved. Just why death ensues has given birth to many theories of cause of death but proofs have never been conclusive. Patients with partial peritonitis and partial obstruction frequently get well. Patients with general or diffuse peritonitis occasionally get well, but never without the restoration of patency of the intestinal tract, the resumption of peristalsis in some measure and the subsidence of clinical signs of intestinal obstruction.

The theories of cause of death in intestinal obstruction, summarized by Lane (JW) in 1917, include the supposition that loss of water is responsible, that a toxic substance is the cause, that this toxic substance is *not* a chemical poison and that the cause is due to some aberrant activity of duodenal and pancreatic cells. He cites the common observation that in acute general peritonitis the picture is practically the same as that at the end of intestinal obstruction.

Hertzler experimented particularly with turpentine, iodine and olive oil in the peritoneal cavity. With the first two, he found death to ensue before there was evidence of any injury to the parenchymatous organs. He found ice-water injected into the peritoneum fatal in a few moments in amounts not fatal when injected subcutaneously. In the first instance *chemical toxicity cannot be denied*. When ice-

*Read before the Minnesota Academy of Medicine, October, 1920.

water is injected, death must be ascribed to so-called shock. That like results may be caused by acute infections, can not be denied or proved, in his estimation.

From the literature, we have to read into the theories of cause of death (1) the mechanical theory of stasis and toxemia, (2) or of incompetency of the ileocecal valve and reflux of colonic contents into the ileum, (3) or of stenosis of the same valve, refusing passage of contents in the normal direction, (4) or of obstructive conditions of the sigmoid, (5) of perverted secretion of the mucosa et cetera and, while we may not gather much encouragement from the wide divergence of these many theories advanced from divers sources, we are at liberty to deduce from them all one common factor, namely that an intestinal toxin exists. What this toxin is and whether it is the sole or primary cause of death in peritonitis and intestinal obstruction, it is not incumbent upon us to prove for the purposes of the present discussion. We need no proof that the peritonitis per se furnishes some of the toxemia. Whether this, however, is sufficient to strike the death-dealing blow if the intra-enteric toxin can be eliminated remains to be seen.

Dragstedt, Moorehead and Bureky (1917) quote the oft repeated supposition that death in obstruction is due to toxemia. They admit the establishment of toxins *more toxic in the obstructed intestine* than in the normal intestine, but they assert that the toxins have not been shown in the blood in obstruction cases and from their experimental work they believe that the theory of dehydration of tissues is untenable, their claim being that there is no excessive vomiting of fluids. They conclude (the italics are mine):

1. That closed intestinal loops in which bacteria are first removed, are compatible with life.
2. That closed intestinal loops in which bacteria are present but in which tissue necrosis is prevented, are compatible with life.
3. That closed *aseptic* loops in which the blood supply is completely occluded are compatible with life.

Their belief, however, is that bacterial activity plus necrotic tissue, or the absorption of toxic products *resulting from the action of put-*

refactive bacteria on necrotic tissue is the important factor in the rapid death, in simple closed intestinal loops.

It is interesting to note the further observations of Dragstedt, McClintock and Chase in 1919 that the substances responsible for the toxemia in acute intestinal obstruction are produced by the *action of intestinal bacteria on proteins or their split products*. They observe that an injury to the intestinal mucosa, particularly that resulting from *disturbances of the blood supply to the intestine*, greatly facilitates the absorption of the poisons.

From the earliest times acute, diffuse or general peritonitis has been a most baffling scourge in the experience of the surgical world. I am constrained to quote Handley's graphic picture: "If there is a condition in surgery, which is stamped with the word 'hopeless' it is that stage of general peritonitis where, in spite of pelvic drainage, cessation of the passage of flatus and persistent foul vomit indicate that complete obstruction has supervened. The rigid abdominal muscles have been forced to yield by the pressure of fluid poured out into the paralyzed intestine and the abdomen is uniformly and tightly distended like a drum. The pulse becomes running, the extremities cold and the patient, measuring the condition by the abnormal clearness of his faculties, only within a few hours of the end, realizes with horrible certainty that he is in the inexorable grasp of death."

About 1890 and prior thereto, the mortality in peritonitis was very high indeed. Treves stated he was doubtful if a single human life had been saved by surgical interference in a genuine case of "peritoneal toxemia." Richardson, in a large number of cases of general peritonitis, verified by bacterial examination, stated that the results with hardly an exception were fatal in his hands under any method of treatment. Delorme is quoted as having operated on many causes of general peritonitis and as having lost all the patients. Dr. Halstead (Chicago) about 1906, said in discussion he considered it more good luck than good surgery when his patients recovered from general peritonitis and that if there was an intense infection, they were not susceptible to any curative

treatment, except in a few mild cases where the resistance of the patient was great.

About 1897, McBurney, McCosh, Abbe and Lockwood began to have better results. But even in 1917, Lane (JW) pointed out that intestinal obstruction and ileus resulting from peritonitis were still presenting extremely high mortality. McGlannan (1913) and Deaver (1915) were showing the mortality in intestinal obstruction to be over 50 per cent and in advanced obstruction almost 100 per cent, in spite of any treatment offered.

The mortality statistics for the reporting districts of the United States for 1918 show 9,733 deaths from appendicitis and typhlitis (which usually means peritonitis and intestinal obstruction as the terminal condition).

Peritonitis arises most frequently in the lower part of the abdominal cavity. Bell (1901) and Tilton (1906) are authority for the statement that appendicitis is the most frequent single cause of peritonitis. According to Tilton's statistics diffuse peritonitis originates in inflammation of certain abdominal organs in the following order of frequency; appendix, female generative organs, stomach and duodenum, remainder of the intestinal tract, gallbladder, kidney and bladder. According to Bell, the *perforations* tend to beget generalized inflammations, with the exception of perforations of the appendix and of the gallbladder, these latter showing a tendency to localize.

Handley showed in 1915 that the intestines below the horizontal level of the symphysis were paralyzed in cases of obstruction secondary to peritonitis, while those above this level, though distended, still retained their contractile power; that there are both large and small intestines in the pelvis and therefore two obstructions to deal with and this dual obstruction he terms "ileus duplex." He states that children especially do not always go on to the stage of obstruction, and he mentions one of his own cases—a boy of twelve. He calls attention to a stage preceding the hopeless stage, in which obstruction is complete but in which the pulse is still relatively good and the vomit has not become offensive. Rigidity is chiefly below the umbilicus. The upper half is softer and there we see slight respiratory excursions of the

abdomen. He calls this "the stage of deadly struggle but not yet of decisive defeat." Here he points out the hopeful indications:

- (1) That general peritonitis is rarely universal.
- (2) That general peritonitis usually begins at the lower limit of the peritoneal cavity and spreads gradually upward.
- (3) That the persistent vomiting indicates that the stomach and upper bowel retain their contractile power to a late stage.

Hertzler observes that the first part of the gut to suffer from paralysis is usually the terminal ileum. Fortunately, the entire gut tract does not reach the same state simultaneously. The ileum may be paralyzed and dilated while the jejunum may retain its power of contraction. As a matter of fact, reversed peristalsis is often an expression of ileal paralysis with retained power of contraction in the jejunum and this must, in a measure, be purposive.

We come now to the subject of intestinal drainage and it appears from a perusal of the literature that as early as 1891, in England, and 1895, in the United States, intubation of the intestine was advocated by Paul and Mixer, respectively. Both advocated the use of a glass tube. In a personal communication, Dr. Mixer states he uses the tube "in many cases of diffuse peritonitis with paralytic distention, as a temporary measure, even tying the small tubes in the small intestine." Mixer observes in an earlier, printed, communication (1895) "how astonishing is the large amount of foul smelling liquid feces which may be removed from the distended coils of intestine, two quarts being not an enormous amount."

Van Arsdale in 1899 reported, with recovery, two cases of peritonitis treated by secondary enterostomy after primary drainage.

Lund reviewed the subject of intestinal paralysis in peritonitis in 1903 and advocated ileostomy, preferring to open above the ileocecal valve. He comments on the cecal operation and the advantage which is claimed for it; that enemata, cathartics and nutrients may be administered through the tube and states that the same may be administered into the small intestine. He records five cases with four

recoveries. Closure of the fistula is done as a secondary measure.

Greenough in 1904 advocated enterostomy on the ground that its great advantage is the drainage of gases and decomposing contents of the bowel and the relief of paralysis of peristalsis. By enterostomy the surgeon obtains direct control over the intestine for lavage and for the introduction of stimulants, nourishment, fluids and cathartics. He believes it is better done as a primary rather than as a secondary measure and he prefers the cecum as the point for enterostomy. In his cases the successes were nearly three times greater where primary enterostomy was done compared with those having had secondary enterostomies.

Lane (JW), on the other hand, in 1917 concluded from his experience of twenty years' observation, that death is due mainly to toxemia from retained intestinal products, whatever they are, and advocated and practiced *secondary* ileostomy for drainage.

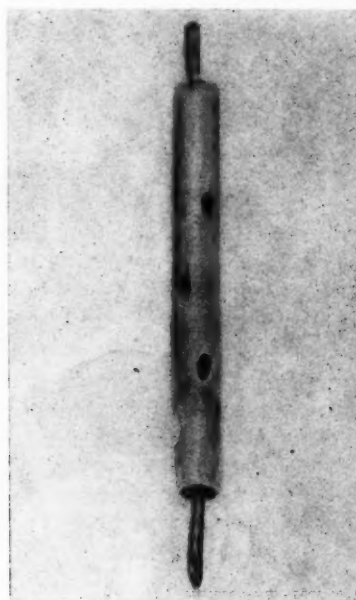
In April, 1919, an important contribution to this subject was made by Hageboeck and Korneder who reported some interesting observations, on fifty acute gangrenous and purulent cases with general peritonitis and no walling off. In ten, where the wound was left wide open for free drainage, a distended loop of intestine would present in the wound, become gangrenous and rupture spontaneously and discharge much gas and foul-smelling contents, sometimes as much as several pints. The patients improved and vomiting ceased. All recovered after draining freely for three to seven weeks. Secondary operations were done for closure. Of eleven other cases, with insufficient drainage, nine died. *The two recoveries had gut perforations.* It was observed that small portions of the bowel, almost always ileum and rarely colon, would angulate and become firmly matted together, being at the same time distended and gangrenous. Therefore, in the next seventeen cases, secondary enterostomies were done. These cases behaved similarly to those rupturing spontaneously. After evacuation of the foul smelling contents, improvement in the patient's condition resulted, distention was reduced, fecal vomiting ceased almost immediately and extreme prostration was replaced by a

feeling of improvement, and cyanosis, rapid pulse and respiration became ameliorated. Secondary operations were performed in forty-seven cases with no mortality.

In September, 1919, Cooney reported his results with the use of a catheter which he inserted either through the appendix stump or through a stab wound in the cecum at the time of operation. He provided peritoneal drainage, and the wound, except for the drainage and intubation tubes was closed. He administers, through the catheter, one-half pint of saline or tepid water into the colon. The catheter is then clamped for one-half hour and then released and the intestinal contents allowed to drain into a bottle for one-half hour. This treatment is continued strictly for four or five days. Should there be abdominal distention after twenty-four hours, four to six ounces of Pluto Water are injected through the tube and repeated, if necessary, every twelve hours until action of the bowels takes place. The catheter begins to drain gas and often fecal material while the patient is on the table. Removal of the catheter is usually done on the sixth or seventh day following operation. In Cooney's series of twenty-two cases, all recovered but two. These died a few hours after operation. Prior to his use of the described method of treatment his cases died.

The composite picture produced by the experiences of these many observers seems fairly to show that the dread spectre of diffuse peritonitis is in reality the peritonitis itself plus an even more to be dreaded poisonous factor, resulting from the associated intestinal paralysis, namely *the decomposed fecal filth retained within the intestinal lumen.*

Before the bulk of the material presented in this communication was accumulated, I had used the method described by Cooney in the following two cases: The first, a young man of about twenty-five years, was run over by a truck, fracturing the pelvis and crushing the pelvic viscera. Within a few hours after injury the abdominal distention was increasing so rapidly that an abdominal section was decided upon and on opening the abdomen the cecum was found to be severely mascerated but not perforated. To relieve the distention



of the injured gut, a large catheter was inserted through the inverted stump of the amputated appendix and the wound was closed without peritoneal drainage. The distention was at once relieved and recovery was uneventful. The second case was one of advanced diffuse peritonitis resulting from a ruptured appendix, which came to my attention late. The same procedure was followed as in the preceding case, with the addition of peritoneal drainage and the wound partly closed. The foul fecal material drained through the tube at first and there was considerable reduction in abdominal distention. The patient was comfortable and improved for several days but grew worse and died. At autopsy the tube was shown to be held perfectly in place and with no leakage around it and the colon throughout its entire length was collapsed but the small intestine showed much distention and contained a large quantity of liquid feces. The ileocecal valve was contracted.

These observations led me to devise the following tube and procedure for its use: A large sized rectal or stomach tube or other non-collapsible rubber tube, with a quarter-inch lumen or larger, is used and quarter-inch windows are cut at intervals of about three quarters to one inch apart in the sides of the tube from tip to

about five inches above the tip. The customary purse-string is placed around the appendix base, the appendix amputated and the stump inverted. The tip of the tube is then pushed in through the sleeve of the stump according to the method of Cooney. The tip of the tube is then deflected slightly and guided through the ileocecal valve into the ileum and pushed forward, until the last or upper hole in the tube is well within and past the sleeve of the appendix stump. The purse-string is then drawn and tied about the tube and that part of the cecum is anchored by stitching to the peritoneum at the edge of the wound interposing omentum between gut and peritoneum. Peritoneal drainage is then provided as may be deemed necessary, the intubation tube occupying one angle of the wound, while the peritoneal drainage occupies the other angle. The holes in the sides of the intestinal tube provide vents for both the small and the large intestine. The ileo-cecal valve is thus held open.

Through the lumen of the intestinal tube a small sized rubber catheter, with blunt nose, may be introduced to the full length of the intestinal tube and even beyond the end of it into the small intestine, for the introduction, by funnel or syringe, of saline solution, or liquid nourishment according to the method of treat-



ment which may be desirable to follow. Gases and liquids have access to the outside from either small or large intestine by means of the perforations in the sides of the intubation tube. After the removal of the tube, the sleeve of the appendix stump collapses and healing takes place readily as in the inverted gall-bladder fundus following drainage. Should the sleeve of the stump be everted in drawing out the tube it should be at once inverted and that part of the would strapped together.

In summarizing the subject matter herein presented, the utter hopelessness of former days has given place to hopefulness of a decided nature, at the present time. Proofs of a toxin or of toxins of a specific nature, are still to be laid down, but practical demonstrations are accumulating showing surgical cures in diffuse peritonitis, by the elimination of pent up intestinal contents and the arrow seems to point toward the problem of obtaining a method best adapted to accomplish this end.

The method of intestinal intubation described above was evolved after a study of the conditions existing in peritonitis and associated intestinal paralysis. By this method it is possible to intubate that part of the intestine, namely the ileum, which is first involved in the paralytic process. The method is best adapted to the

early cases. By perforating the sides of the intubation tube a number of vents are provided for both small and large intestine. By inserting the tube through the ileo-cecal valve, spasm of that valve is overcome. If reflux of cecal contents into the ileum is a factor, the tube provides an outlet. Gaseous distention and fecal stasis have also, by means of the perforated tube, an outlet. If gaseous distention, with crowding of the intestinal loops, is responsible for the cutting off of the intestinal blood supply, as suggested by Dragstedt and his associates, with consequent gangrene of the intestine, any method which will reduce the gaseous distention should tend to offset this possibility. By means of the catheter within the tube it is possible to irrigate the small intestine or to administer medicaments or nourishment. Through the intubation tube it may also be possible, by lavage of the intestine, to make such experimental studies on peritonitis cases, during treatment, as may be necessary to establish more definitely the specific nature of intestinal toxins.

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THE REPAIR OF HARE LIP AND CLEFT PALATE DEFORMITY*

By HARRY P. RITCHIE, M. D., F. A. C. S.

Associate Professor of Surgery, University of Minnesota
St. Paul, Minn.

At the outset I ask to be absolved from the charge of trying to suggest anything new in the consideration of this subject. Attention has been called to it by many of the most eminent surgeons of the world and a vast accumulation of literature is at hand for any one interested. I find in visiting clinics and meeting the men doing this work extensively that each has elaborated technical details and formulated rules governing his attitude toward these cases, all of which is in a sense individual.

So also in the work coming to me in private practice and through my affiliation with the University Hospital, through experience and suggestions therein encountered, I am now operating and viewing the individual problem upon the following basis: The general surgical considerations of this subject are founded upon the acceptance of three facts:

1. Hare-lip and cleft palate are not two distinct and separate entities, but simply a degree of failure of the same embryological process of fusion.
2. In formation of the face, closure takes place normally from before backward.
3. The bones of the face and mouth after birth do not become fixed or rigid under an arbitrary period of three months.

The first proposition is a broad interpretation of the embryological fact that the bones and overlying integument are formed from three

separate points of origin or rather several points of origin arranged in three groups. Of this fact arises the explanation of the number and degrees of combination in these defects.

So numerous and variable are they that to me the proper surgical procedure is somewhat confusing unless it is possible to simplify their consideration.

Consequently I have divided all cases into four groups based upon the combination of defects and the surgical measures required for repair.

Group I. Includes all cases of hare-lip, whether single or double or of any degree in which the alveolar arch is already intact.

Group II. Includes all cases of cleft palate, whether single or double and of any degree, in which the alveolar arch is already intact.

Group III. Includes all cases of single, complete hare-lip and cleft palate.

Group IV. Includes all cases of double, complete hare-lip and cleft palate.

I readily appreciate the fact that many objections may be taken to this grouping as not infrequently we see a hare-lip and cleft palate without involvement of the arch, but under such circumstances this case, in my opinion, will fall first in Group I and then in Group II, and so forth.

Now the whole question of surgical treatment, and the one which seems to me not to have been sufficiently emphasized, is definitely and positively influenced by the condition of the alveolar arch. If the arch be closed, the measures resolve themselves into comparatively simple procedures. If the arch be open singly as in Group III, or doubly with protrusion of the premaxilla, as in Group IV, the problem is then so enlarged as to afford most interesting consideration and debate.

TIME AND SEQUENCE OF OPERATION

In Group I, the problem is purely cosmetic. It is true that, the defect causes difficulty in nursing of the new born, but artificial feeding is possible and satisfactory. Without associated defects no penalty is paid by delay in the repair, and operation is entirely a matter of convenience, and equal results obtained when done the first day, the first week, postponed until adolescence or later life. Performed with a minimum of shock and danger, it should and can

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Fig. 1. (Berry & Legg). The whole question of surgical treatment is definitely influenced by the condition of the alveolar arch. If the arch be normally closed no matter what the defect is, fore or aft, the measures resolve themselves into simple operations, but if the arch is open singly as in the 3rd group or doubly as in the 4th group, then the problem is so enlarged as to permit of interesting discussions and debates.

be done as early as possible compatible with the condition of the child.

In Group II, the operation carries with it a greater traumatism, more difficult maneuvers, a longer procedure, more danger of blood loss and post-operative complication and hence requires a careful study of the age and general physical condition of the patient.

Phonation, intonation, and the various forms of our speech effects are herein so transformed as to render these people marked among their associates. The rule that the palate be closed before speech function is developed is proper. It can be done at any time of life, and even in adults, by care and development, wonderful results may be obtained. Before the end of the first year is quite satisfactory, but in selected cases by attention to a few details, I am closing the cleft at an earlier date.

Group III. The various debates as to the treatment of this Group gives rise to the question of sequence of operation. By reason of the alveolar arch hiatus, mechanical measures as typified in the Brophy operation have been suggested as primary procedures for its closure.

It is a clinical fact that these methods are efficient in closing the arch and narrowing the palate cleft, but as regards closing the cleft, added surgery is required. The method has, I believe, been misconstrued in general as being an operation on the palate, whereas, the effect so far

as I know and have seen, simply closes the arch. Mechanical measures are now generally questioned as to their necessity as it is easy to demonstrate that equal results may be obtained by first building the lip.

The second primary proposition is the embryological fact that normally the fusion of the face tissue takes place from before backwards.

It is most reasonable to me to believe that in the early foetus the mechanical effect of the lip by pressure upon the pliable unformed bones behind it materially helps in their fusion. So do we see this effect in the living baby as it is a constant experience to see the alveolar arch closed within ten days after the lip operation.

The third primary proposition, that the bones of the face do not become fixed under an arbitrary period of three months, is born out by this observation of lip pressure, and while mechanical measures also prove this fact, I believe they do not take into consideration the equal effects of the lip. Therefore, while in Group I, the first consideration is the cosmetic result, in Group III we have added the very important mechanical effect which I believe is the first consideration. Delay in operation allows the arch and maxillae to become set and leads towards a more difficult later operation on the palate. Therefore, I think I can say positively, distinctly, and definitely, that it is essential in the third group that the lip should be repaired at the earliest possible date, so soon as the baby is established, and preferably within the first 10



Fig. 2, Group 1. Single or double harelip, 1st degree, 2nd degree or any lip combination in which the alveolar arch is normally closed.



Fig. 3, Group 2. It is difficult to obtain photo of the 2nd group so am using a 3rd group case. If you will conceive that the lip is closed either normally or by previous operation and that the arch is normally closed, then any defect of uvula or hard palate, single or double, is described, and discussed as a 2nd group case.

days or two weeks. The palate to be done as in the second group.

Group IV brings up the same considerations as in the third with the added feature, that the lip repair is more extensive and is complicated by protrusion in various extent of the premaxilla.

Mechanical measures here also are employed dealing not only with the arches, but with the premaxilla. These have all been tried out with the conclusion that no more is accomplished than by the early closure of the lip.

The points then as regards age are:

Group I. Any time that is convenient; early



Fig. 4, Group 3. Single complete harelip and cleft palate or more properly described as an unilateral cleft of the alveolar arch, since this is the distinctive feature of this group from a surgical standpoint. It is in this group that mechanical measures are suggested as primary procedures; discussed in the text.



Fig. 5, Group 4. Double complete harelip and cleft palate or more properly described as bilateral cleft of the alveolar arch since the two sided defect is the distinctive surgical feature in which special steps are indicated, not present in the other groups.

operation giving better control of the baby and greater ease of accomplishment.

Group II. At the end of the first year, but possible owing to improved methods, to do earlier in selected cases.

Group III and IV. Essential to perform lip within first three months, preferably in first 10 days or two weeks because of its mechanical effect, the palate falling then into the consideration of the second group.

SURGICAL CONSIDERATIONS IN THE REPAIR OF THE LIP.

All lip conditions, whether falling in the first, third or fourth groups are repaired with attention to the following four principles:

1. Reposition of alae.
2. Approximation of the muco-cutaneous border.
3. A long lip.
4. A thick lip.

These points are made in the effort to accomplish the best possible cosmetic effect which is the end in view with the simple hare-lip.

In the third and fourth groups they are performed first for the mechanical effect on the arches and palate and second for the cosmetic effect.

There are many, many procedures for repair of the lip, to which the names of Nelaton, Malgaigne and six others are associated, each operation deviating from the other in some angulation or line of incision and denudation. At present the general attitude is that such steps are unnecessary and their use takes but little

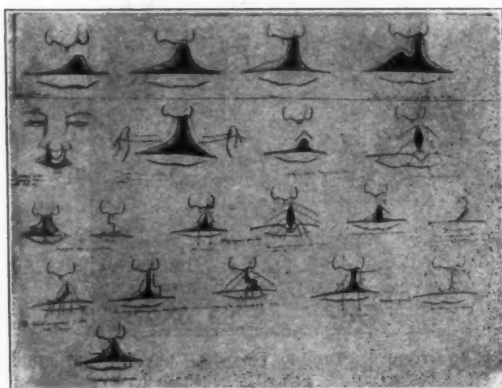


Fig. 6. Chart prepared by the late Dr. J. Clark Stewart. There are many procedures for the repair of the lip to which are attached the names of Nelaton, Malgaigne, Hagadorn, Golding-Bird and several others; each operation deviating from the other in some angulation or line of incision and denudation. Who of us has sufficient surgical acumen to select the proper operation for the individual case?

cognizance of the extraordinary mobility of the lip and cheek tissues. The fact that they may be moved widely makes a straight simple line denudation possible.

Every confidence may be placed in the viability of these tissues. It is most difficult to cut off their blood supply and they will stand in comparison with other body structure an unusual amount of suture tension.

In all plastic work upon the face and lip, union of wounds is enhanced by the appreciation of the fact that there are three separate layers of tissue: (1) the skin, (2) muscle and connective tissue, and (3) the mucous membrane. A stitch placed through all three, tends to contract any denuded surface. One of the very important features of the operation is the approximation of broadly denuded surfaces, and this is best accomplished by including the mucous membrane and muscle layers in one series of sutures, while the skin is approximated separately or the same result obtained by closing the mucous membrane by one line of stitches and the muscle and skin together as is always done in lower lip operations.

The acceptance of this principle then permits one a wide variation in the selection of suture material and methods of insertion. And there are many suggestions in this regard: Silver wire with shot to hold the nostril in position,

insertion of silk especially prepared, knots on the skin side, knots on the mucous membrane side, and so forth.

The point is that it seems to make but little difference what is used so long as the principle of two series sutures is used.

The accomplishment of reposition of the *alae* is the most difficult procedure, and the reason of failure is the lack of appreciation that the attachment of the wing of the nose to the mid-line is not a point but an approximation fully an eighth to a quarter of an inch, i. e. there is a well defined base to the nostril. Therefore one stitch, whether it be a retention suture or skin suture, cannot be expected to make this wide closure. Two stitches at the nostril are always necessary. I think the demonstration of this point has given me more satisfaction than almost anything else in connection with closure of the lip.

If we accept the statement that lateral angulations are unnecessary and straight line denudations are indicated, one can then follow easily the mucocutaneous border from the ala of the nostril towards the mouth corners, a sufficient distance, sometimes measured equally by dividers, and simply suture the lines laterally. In doing so, however, a wide surface of denudation is required, and an extra strip of mucous membrane is removed. The wider the strip, the thicker lip that results, the longer the lines of incision, the longer the lip.

In approximation of the muco-cutaneous border the main difficulty in the single lips is, that on the short side the mucous membrane tends to roll inwards; plenty of mucous membrane on the long side, not enough on the short, resulting in a cork screw effect. This usually corrects itself but can be controlled by extending the mucous membrane incision beyond the skin incision, sometimes leaving an uncovered area, which always heals.

In placing tension sutures I have elected to put them on the mucous membrane and muscle side, believing that main structure of the lip lies there and also because, with the denuded lip everted, a wide deep stitch can be accurately placed, embracing a definite positive bite of the muscle tissues, while the knots leave no scar, and should the stitches cut, no penalty is paid as wounds on this tissue readily heal. This per-



Fig. 7. A "Before and After" picture showing the wide distances that these tissues may be mobilized permitting straight line incisions and lateral approximation.



Fig. 8. (Same footing as Fig. 7.)

mits very fine approximation stitches in skin, of horsehair or a Dermol, with the assurance of a minimum of scar on the line of union.

I began by placing in a number of tension sutures, sometimes 5 or 6, but I believe three or four are only necessary, two at the nostril, close together, and one at the mucous membrane border, or in some cases one between.

The technical requirements are as follows:

1. Straight line incisions.
2. Wide denudation of the mucous membrane.
3. Two point suspension of the ala.
4. Two series sutures lines.
5. A clean wound.

Following this, various suture materials, methods and manner of insertion of them may be employed as selected by the individual operation. These principles apply also in closure of

the lip in the third and fourth groups. In double incomplete hare-lip of the first group, and double complete hare-lip of the fourth group there are several suggestions and illustrations which are for me personally impossible of accomplishment. Particularly those that bring again into use the right angular incisions. By their use I find that approximation is difficult and even when satisfactorily done, yield a lip that still is deformed in that it may be excessively long with a result that the mucocutaneous border is pulled to a marked degree under the pre-maxilla.

Several writers, notably Brown, have concluded that the right angle incisions are not proper and suggest in the double lips that each notch be repaired separately. This conforms to the first principles but it is my experience that it is most difficult to make a presentable vermillion border, and in those that I have attempted it was necessary to perform a secondary repair.

I have then in these cases compromised with myself by using straight line incisions in the form of a Y. The angulation on the pre-maxilla may be criticised as contrary to the first principle of technic mentioned, but at least the incisions are straight lines, and so far the closure is eminently satisfactory.

THE SURGICAL CONSIDERATIONS OF THE PALATE

Simple incomplete cleft palate is not infrequently an easy operation. Undertaken before the twelfth month a complete success is assured. When, however, repair is delayed until later life there are greater chances of failure, parti-



Fig. 9. A failure in group 3 due to infection used to show the straight incisions. The longer they are the longer the lip, the wider the denudation of the m.m. the thicker the lip.

cularly with the soft palate, which, having no function over a period of years, tends to atrophy, with the result that there is a minimum of tissue with which to work.

Closure of the cleft deals not with the palate bones but with muco-periosteal flaps, which are separated from the palate bone and swung from the alveolar arches, a trap door effect, known as the Langenbeck operation.

In this group as in the third and fourth groups Mr. Lane suggested that the flap on one side be cut from the alveolar arch, swinging from its attachment on the cleft margin and then sutured under the raised flap of the opposite side. On account of limited tissue and some of the very flat roofs, the Langenbeck procedure is impossible and the only method is that suggested by Mr. Lane. Leaving the palate bone denuded the appearance of the operative field is most discouraging, but in my limited experience the viability of these flaps is most extraordinary. The operation is not generally accepted as a routine procedure and surely the look of the resulting palate in no way compares to the old time methods. As a second procedure in closing holes following the ordinary operation, partial flaps are eminently successful.

The mobilization of the flaps is usually easily accomplished by elevators. The soft palate is separated and loosened by cutting sometimes through the posterior pillars. It is no uncommon experience to be able to bring the uvula almost to the front alveolar arch.

The first essential in cleft palate is relaxation.



Fig. 10. The base of the nostril is $\frac{1}{4}$ to $\frac{1}{2}$ inch long. One stitch can hardly be expected to effect this wide approximation. Two stitches at the nostril, placed close together are indicated.



Fig. 11. The approximation of the muco-cutaneous border is sometimes difficult. In single lips of the first and third groups, on the short side, the m.m. tends to roll inwards resulting in a cork screw effect. Usually it corrects itself but can be helped by extending the incision on the m.m. further than on the skin.

It is an entirely different condition from that of the lip. The tissues are more friable and normally more fixed and unless tension is removed failure is certain. This has been long appreciated and to such a degree that every illustration of cleft palate work includes what seems to me enormous relaxation lateral incisions. I find that they are necessary in only about one-third of the cases and seldom to any such degree as ordinarily shown.

The second consideration is a wide approximation of denuded surfaces. Any attempt to simply bring together edges of the muco-cerios-teal flaps results in failure, because their edges are very thin and have a minimum blood supply.



Fig. 12. Any transfixation stitch tends to contract denuded surfaces, therefore two series suture lines are indicated. Tension sutures are placed on the mucous membrane side, permitting approximation stitches in the skin, a minimum scar resulting.



Fig. 13. In double lips of the first and fourth groups, there are several suggestions bringing in again right angle incisions. It is possible to close the lip but they often have a deformity too evident to be satisfactory.

There are several illustrations in the books and periodicals where this margin is cut away. But so far in my work this tissue is used and is important I think, in preserving the contact of the real palate. By everting this edge into the mouth by the use of the mattress stitch it is often that a definite raphe can be made which protects the tissues beneath.

The soft palate can be sutured readily. There is definite muscle structure. Mattress sutures do not seem to do well and I think, now, it is quite general practice to place single stitches on the mouth side and continue them around the uvula upon the nasal side, which is easy of ac-



Fig. 14. This is the quite constant result in double lips of the first and fourth groups when the "Y" closure is made, building the lip high up on the premaxilla of the fourth group and single approximating denuded areas in the first group.



Fig. 15. Berry and Legg. It is difficult to illustrate operation steps on the palate while drawings may be misinterpreted. If the operation is undertaken before the fourteenth month or two year period and has been anticipated by early lip repair or the use of the Brophy method success is usually assumed. Most of my failures have been in the second groups which have been neglected.

complishment owing to the great relaxation possible to this tissue. All plates, wires, taps, and the like, are now obsolete.

The point of failure is at the junction of the hard and soft palate and may occur in any case and under the most favorable circumstances. Secondary operations are most satisfactory and it is in this situation that the partial lateral flaps, after the manner of Lane, are so successful.

Brown has anticipated this occurrence and suggests that only the hard palate be done at the first sitting. It is a constant observation that in many cases there seems to be more palate tissue as time goes on, and what seemed to be a very difficult closure at birth results in a really high-arched palate. It therefore seems a



Fig. 16. Berry and Legg. In the 4th group it has been suggested that the vomer be cut. If any such length be removed as illustrated here the lip will be so depressed as to leave a marked deformity. Often by strapping an early lip repair, the premaxilla will seek its normal relations to the maxilla, but usually the smallest nick in the vomer is necessary.

reasonable procedure to close the hard palate early and at a later date the soft palate and thereby anticipate the post operation holes. I have not as yet subscribed to this procedure but am quite favorably disposed.

The fourth group brings up special consideration dealing with the protruding pre-maxilla. This group carries with it the greatest deformity which is in some degree fortunate for the child, as I find that the parents will not permit delay and we get these babies at the earliest possible moment.

All principles hereto outlined apply to both the lip and palate. Mechanical and operative measures are suggested to relocate the pre-maxilla. The one step universally deprecated is the removal of this bone. The resulting deformity is so evident and marked as to be but little improvement on the original condition. This procedure is, however, still occasionally done by the uninformed, but is entirely unnecessary and cannot be too severely condemned.

It has also been the form to excise a V shaped piece from the vomer in order to allow the pre-maxilla to fall in contact with the alveolar arches. Illustrations are abroad in which the distance shown in which this vomer is excised, is extraordinary. Such maneuver will permit the pre-maxilla to go back so far as to present a similar condition to complete removal.

In many cases notwithstanding the seemingly wide gaps to be covered, it is possible to build the lip without touching the vomer at all. The lip bringing it back into position and even then in some cases too far.

In conclusion of this, my cursory paper, I will say:

1. That each individual case be immediately placed in one of four groups and that degrees of defect in that group be dispensed with as confusing and complicated.
2. That if the surgical principles as outlined in both lip and palate work be accepted, they permit of a wide variation in technical details.
3. That the constant clinical observation of the mechanical effect of the lip upon the tissue behind, in the third and fourth groups be accepted as all important as indicating earliest operation.
4. That plasticity of the bones of the face

holds to three months and in some cases longer and that this makes imperative early lip repair.

5. That the most reasonable basis of closure is to follow nature's path and form.

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DISCUSSION

DR. H. B. ZIMMERMAN, St. Paul: Dr. Ritchie told me he wanted to be absolved from trying to give anything new. This paper that Dr. Ritchie presented this morning is quite entirely new. The subject of closure of harelip and cleft palate is quite a remarkable one in that there has been so very little progress. There is no reason why there should not be. If the very first operator who tried to close a cleft palate or a harelip realized what he was trying to do, namely, that he was trying to make a normal face, he would have eradicated quite a number of the mistakes that are made in this operation. In other words, if he had taken a little inch rule and measured the distance from the tip of the nose to the lip and in the case of double harelip measured the distance from the premaxilla to the lip, he would find that he would make the nose more deformed by attempting to close the premaxilla. There is the same proposition in cleft palate. The deformity is a general one. The ala of the nose is plastered clear to one side and when it is replaced to the midline where it belongs the shortness from the tip of the nose to the premaxilla is not nearly so apparent.

Dr. Ritchie said that one of the essentials was to make a long lip. It has been my mistake usually to make too long a lip. I think Brown obviates

that by closing each side separately and not by making such a great attempt to close below the premaxilla; it makes too long a lip and makes an obvious deformity which we see too often in harelip. Dr. Ritchie laid stress, and rightly so, on bringing the alae of the nose with a thick flap to the midline and closing with two sutures. That is quite important. I think most people have not paid attention to that fact, that the alae must be brought to the midline. The ala of the nose is attached practically to the midline. That is one of the essentials in closing harelip, that is, to bring the alae of the nose to the midline. Having done this there is very little protrusion of the premaxilla. We occasionally see cases where the premaxilla has been crushed back or removed with the idea of being able to close the lip by lateral flaps. That is a grave mistake.

The first double harelip I ever operated on was about six or seven years ago at the University Hospital and the problem was what to do with this peak on the tip of the nose. I went over the literature and asked my chief in surgery at the University Hospital. His suggestion was to cut a V out of the deformed mouth. So I went at it with the idea of doing that, but first seeing what could be done so I would not take out too much. I separated the lip widely on either side and then took tension sutures to see how much I had to remove. I was surprised to see what a good anatomic result I got by bringing these flaps up to the premaxilla.

With regard to the closure of the palate, the Langenbeck procedure is not as satisfactory as the Lane procedure, because the latter causes much less liability to infection.

DR. GORDON B. NEW, Rochester, Minn.: Dr. Ritchie has given us a very complete and valuable resume of the present day treatment of cleft palates and harelips.

The child's lip should be brought together when it is between three and four months old, since a better cosmetic result is obtained than if the lip is closed when the child is a few days or weeks old. It is very difficult when the child is a few days old to get a good result on the nose and lips that does not require further operation. The bones of the face do not become fixed until about the third or fourth months. The pressure of the lip, if it is brought over the alveolar process, will bring the process together so that by the time the cleft palate is operated on the cleft alveolar process will be approximated.

In bringing the lip together I believe it is essential to make the nose a shade too small, because in a week or ten days the cartilage of the nose tends to spread out, thus making a widened nostril, the common deformity seen in cases of harelip. If the nose is made a trifle too small it will spread out to about the proper size.

In making the vermillion border it is wise to make it a little too full, otherwise when the wound heals

there will be a notch, which also is a common post-operative deformity of harelip.

Putting two silk worm stay sutures inside the nose is a valuable procedure, although if the nose is made a little too small they will hardly be necessary.

I believe the same procedures should be followed for double and single harelips. The premaxilla should not be touched but the lip should be brought together over it. The pressure of the lip brings the premaxilla back into good alignment. I do not believe that any mechanical procedures are necessary to accomplish the results if the child is operated on when it is three or four months old.

In cleft palate work I have followed the Langenbeck procedure except in double clefts, in very wide clefts, or in secondary operations. In these cases I have employed the Lane flap. I find often that the soft palate will come together with the Langenbeck method but I cannot get the hard palate together.

The wide free lateral incisions are to be condemned. If incisions are made as outlined in pictures in text-books, the posterior palatine artery will almost surely be cut across. As in any other plastic operation the blood supply is the important factor. If the main blood supply is cut in making the lateral incision there will probably be a sloughing of the flap.

To have the palate will freed up is the most important part in cleft palate operation. The hard and soft palates are attached to the posterior margin of the hard palate and cutting across the aponeurosis at right angles to the mesial margin of the cleft is necessary to allow the palate to come up into the mouth. The same procedure should be used in clefts of the soft palate. The palate should be closed before the child is fourteen months so that he may begin to talk with the palate closed.

DR. R. E. FARR, Minneapolis: I enjoyed Dr. Ritchie's paper very much but regret that I must disagree with him on one or two points which relate to the principles. The question of the proper manner of handling these cases always presents when a cleft palate baby is brought into the world. The question is: what advice must we give the baby's doctor? and, what course shall we advise?

The investigations of Mr. Keith, in England, showed that the loss of tissue in the palate in cleft palate cases averages about 3 mm., an amount so small as to be negligible. We therefore have little loss of tissue in these cases. We always have a deflection of the nasal septum, which carries the nose to one side, and a line bisecting the face will pass through the center of one of the alae instead of through the center of the nose. The cleft is due more to a separation of the lateral halves of the superior maxilla than to a loss of tissue. This led Brophy to the reposition operation with wiring. It is significant that Brophy and Blair—I talked with Blair within two months, and he is thoroughly in accord with the

method of reposition—who have done more of this work than anybody in this country, and the only men I have ever seen who did the wiring operation according to the method of its originator, are still satisfied with it.

I have had a number of cases present themselves for operation in advanced childhood or in early adolescence in which the lip had been closed in infancy. At a meeting at Faribault, a few years ago, I showed pictures of four of these in which the anterior portion of the cleft still admitted one finger and, of course, in no case can there be bony union after the surfaces are covered with mucous membrane. In every case I have seen where the lip only was closed in infancy the nose was deflected to one side.

At this time I desire to present a case on which the Brophy wiring operation was done two months ago. The child has just returned for the purpose of having the wires removed. This case illustrates what happens when this operation fulfills its function and I would like to have you gentlemen note that the nose lies exactly in the center of the face. Note the contact of the alveolar process in front, and note that the cleft, which remains to be repaired at the end of another year, is almost insignificant in its proportions. Note also the healthy condition of this child, which has gained 2000 grams since its operation.

I believe that the dissatisfaction with the Brophy method has come about largely through its faulty application. The wires have been placed too low and the alveolar processes have been tipped over, whereas the bones should be approximated.

DR. HARRY P. RITCHIE, St. Paul (closing the discussion): There is no effort to suggest anything new, but to rearrange known facts in what seems to me a more orderly fashion. There is no disposition on my part to find fault with the Brophy method. It does just what is claimed for it and the only question is, whether it should be used as a routine method in the third group. If men closing the alveolar arch by doing the lip first in sufficient time to close the palate within the 12 or 14 months or two year period, it brings up the question of the necessity of the mechanical measures. What I mean by a long lip is a lip made long enough to prevent some contraction which always occurs. The trouble in the 4th group is that the lip may be built below the premaxilla instead of upon it. When this is done, and the premaxilla recedes, the lip is found to be too long. But if the lip is not satisfactory it can be done over again, since the purpose of the lip in the 3rd and 4th group is primarily a mechanical effect on the alveolar cleft.

HEMORRHAGIC DISEASE OF THE NEW-BORN.*

By F. C. RODDA, M. D.

Assistant Professor of Pediatrics, University of Minnesota
Minneapolis, Minn.

Though this disease is one of the oldest known to man, it has always been surrounded with much confusion, and our present knowledge of the ultimate cause is still incomplete.

As with many other syndromes in medicine, the nomenclature is complex and confusing. Melena, hemorrhagic diathesis, omphalorrhagia neonatorum, hemophilia neonatorum are but a few of the terms found in the literature. Names indicating the site of the bleeding have led to a further multiplicity of terms such as, purpura of the new-born, when hemorrhages occur in the skin; melena, bleeding from the intestinal tract; omphalorrhagia, bleeding from the cord; hepatic, adrenal, and cerebral hemorrhages. Unfortunately with so much emphasis on names characterizing the location of bleeding, the very fact that hemorrhages are usually multiple has been overlooked. Hemorrhage may occur in every organ and structure of the body and in varying combinations.

Warwick¹ reports that more than 50 per cent of the cases of hemorrhage occurring in the New-Born Clinic of the University of Minnesota have been multiple. At autopsy, hemorrhages have been found in the brain, lungs, liver, kidney, adrenals, skin, retina, and over serous and mucous surfaces. This is in agreement with Townsend's² observations which showed bleeding from the bowel and cord alone in only 22 out of 50 cases.

Lequeux³ in his Paris thesis in 1906 gives a comprehensive review and bibliography of the subject. He illustrates the confusion and lack of knowledge by presenting four stages of historical interest and study:

1. Up to 1825. The period of confusion.
2. 1825-1835. The period of clinical study. Widely varying causes were cited. Too late tying of the cord had its supporters, while too early ligation was quite as warmly advocated as the cause.
3. 1835-1875. Pathological anatomical stud-

*Read before the Minnesota State Medical Association, St. Paul, October, 1920.

ies revealed a variety of lesions such as embolism, ulceration, patent ductus arteriosus, and other congenital heart defects. These, when found in conjunction with hemorrhages, were naturally pointed out as the etiology of the bleeding.

4. 1875-1906. The period of laboratory study. This being the era of development of bacteriology, it was not strange that the cause of the hemorrhages should be laid to bacterial invasion of the blood stream. Many of the pathogenic bacteria were charged as agents of the disease. Gartner⁴ in 1893 even claimed the discovery of a specific, hemorrhage-producing bacillus.

5. There can now be added a fifth period from 1908 to the present. Modern studies of the physiology of the blood, especially its properties of coagulation being the newer contribution—the causes of hemorrhages are sought in this field. It has also been suggested that certain changes in the vessel walls are involved in the disease.

Out of the chaos, Schloss and Commiskey⁵ have brought a simple, understandable classification of hemorrhages in the new-born. Hemorrhages during the first days of life may be:

1. Traumatic—from obstetric or surgical procedures.
2. Accidental—as illustrated by insecure tying of the cord.
3. Spontaneous—without apparent cause.

Further, spontaneous hemorrhages may be classified as:

(a) Symptomatic—incidental to diseases as sepsis, congenital lues, or in the offspring of families showing true hemophilia.

(b) Idiopathic—which is to say, up to the present, without known cause. This paper deals with this latter type under the generic term "Hemorrhagic Disease of the New Born," as first suggested by Townsend.¹

FREQUENCY.

The frequency of the disease varies within wide limits according to different observers:—Winkel,⁶ Gerhardt,⁷ Ribemont⁸ report one case of hemorrhage in each 5,000 births, while Orlovsky⁹ found the rate 1 to 116 births. This discrepancy arises from the fact that early observers took note only of the cases presenting signs of external bleeding, and overlooked those

with internal hemorrhages. Later writers, from closer pathological studies, find death in the new-born due to internal hemorrhages often when entirely unsuspected. From our experience in the New-Born Clinic at the University of Minnesota, with blood studies and careful autopsy control, we would say the incidence of hemorrhagic disease is one case in each 100 births. At any rate, the frequency is much greater than one would be led to believe from reports found in the literature.

SYMPTOMATOLOGY.

The symptoms depend largely on the extent and site of the bleeding. The onset is within the first eight or ten days, most frequently on the second or third day. There are usually no striking premonitory symptoms, restlessness and pallor first calling attention to the infant. The temperature is usually normal, though there may be temporary elevation. It becomes subnormal after an extensive hemorrhage. Presently may be noted the discharge of blood externally, emesis of blood and tarry stools (true melena), bleeding from mouth, nose, umbilicus, urinary tract, skin, or a rapidly growing cephalhematoma. Under these conditions, he who runs may read. However the hemorrhage may be obscure, and external bleeding may occur very late or fail entirely. There may be dyspnea with hemorrhages into the lungs, pericardium or pleural spaces; collapse, resulting from hemorrhages into the liver, adrenals or abdominal cavity, marked disturbances of respiratory and cardiac rhythm and vasomotor symptoms from the pressure of blood over the base of the brain, convulsions from a blood clot over the cerebral cortex. In fact, no more complex pictures of disease are found in medicine than in this malady.

ETIOLOGY.

It is a well known clinical fact that certain types of infections, such as streptococci septicemia, produce tendencies to hemorrhages. The new-born offers no exception to the rule. This agrees with the observation of epidemic hemorrhages in new-born wards accompanying puerperal infections, as observed by earlier writers. The same cause was operative in Buhl's disease, and Winkel's syndrome which, thanks to better obstetrics, have passed out of our experience. Doubtless some cases of bacterial infection still occur and produce hemorrhages, but later stud-

ies show that much of the bacteriological theory is untenable. These cases show little or no elevation of temperature, nor other signs of septicemia, and once the bleeding is controlled, there is immediate recovery except for slight anemia. Lambert's¹⁰ case of a classical and very severe hemorrhage showed instant recovery as a result of direct transfusion of the father's blood. Lues may operate as a cause in certain cases, as also the very rare gastric and duodenal ulcers. Likewise certain degenerative changes in the liver, as in congenital familial icterus, and phosphorus poisoning, produce hemorrhages. However all these conditions produce actual pathology demonstrable at autopsy, and the hemorrhage may be considered secondary or symptomatic. On the other hand in true hemorrhagic disease no pathological changes have been demonstrated except the uncontrolled tendency to bleed. Observation of unusual congenital lesions, as patent ductus arteriosus, and heart lesions, we now know to be no factors. Cerebral hemorrhage has been given as a cause, whereas, we now know it to be often a manifestation or symptom of hemorrhagic disease.

According to our present light, it appears that the latest theory as to the cause of hemorrhagic disease is the most tenable, namely changes in the blood or blood vessels. Further, I believe that the latter factor can be discarded. No gross nor microscopic changes have ever been demonstrated in the vessels. If the ultimate cause of hemorrhage resided in the vessel wall, it is difficult to understand results such as Lambert's¹⁰ obtained by transfusion of blood. One would rather anticipate that the blood introduced would continue to escape from the vessels.

Bowditch,¹¹ and Minot¹² and other early observers had noted the thin watery condition of the blood, its failure to coagulate normally and the futility of local measures in checking its flow. Schwarz and Ottenberg,¹³ and Lucas¹⁴ have observed impaired coagulation of the blood which they believe is due to a deficiency of some coagulation producing substance, or excess of an anti-clotting factor. If this is true, injection of normal blood or blood serum should overcome the disease. This has been demonstrated by various measures. Lambert¹⁰ obtained striking results by transfusion, Welch¹⁵ employed human blood serum with gratifying results, Leary¹⁶

obtained help from the use of animal sera. The injection of whole blood subcutaneously by Schloss and Commiskey¹⁷ proved efficacious.

I believe the cause of hemorrhagic disease in the new-born is some physical or chemical change in the blood which produces delay and impairment in its coagulation properties, that the most constant findings in this disease are a delayed coagulation time and a protracted bleeding time. Further, these findings may antedate any symptoms by hours or days even. These changes may be the only signs of hemorrhage, external bleeding failing in many cases. Some conflicting results have been reported, which I believe are due to varying and unwieldy methods employed in performing coagulation tests, and lack of knowledge of the normal new-born coagulation and bleeding times.

Studies¹⁸ of the new-born blood were undertaken in searching for an explanation of the very frequent finding of cerebral hemorrhage following normal deliveries where traumatic factors failed, and where bleeding was often multiple. A number of these cases showed delayed coagulation and delayed bleeding times. The results of the study I reported in the *Journal of the American Medical Association*, August 14, 1920.

The method¹⁸ of determining the coagulation time which I employed is described in the *American Journal of Diseases of Children*, April 1920. It is very simple and capable of employment under the most primitive conditions. Briefly, it consists of collecting a freely flowing drop of blood in a clean watch glass, containing a clean No. 6 lead shot. The end point of coagulation occurs when the shot is caught up in the fibrin and no longer rolls. The bleeding time was obtained by Duke's¹⁹ method. Our results in many hundreds of determinations on several hundred new-borns show the normal coagulation time range from five to nine minutes; the bleeding time from two to five minutes. In cases of hemorrhagic disease with varied symptoms such as cerebral hemorrhages, hematuria, melena, and multiple hemorrhages, we have found the time delayed many minutes and in some cases hours.

MORTALITY

With the older treatment of drug administration and employment of styptics and local measures, the mortality was high. In cases of un-

bilical hemorrhage, Furth reported a mortality of 100 per cent. Lequeux³ in his monograph observed a mortality of 80 per cent. Numerous statistics vary from 32 to 100 per cent. With newer methods of treatment, this rate has been lowered very greatly. We have, however, no extensive tabulation from which to quote percentages. A very great factor in treatment is the duration of the disease, the earlier blood therapy is employed, the greater is the percentage of recoveries.

TREATMENT

In the treatment, we have employed blood by direct transfusion, injection into the superior longitudinal sinus, and subcutaneously. The two former methods are difficult, but best if there has been a great loss of blood. But if the hemorrhagic condition is recognized early, subcutaneous injection has proven entirely satisfactory. The technique requires a healthy donor, from whom blood to the amount of 30 c. c. is obtained by venipuncture, and this immediately injected under the infant's skin. For this method, blood grouping is not necessary. The injection is repeated every 6 to 12 hours until the bleeding is checked or the blood studies give normal findings. In our cases, we have succeeded in getting the bleeding and coagulation times down to the normal range.

CONCLUSIONS.

1. Hemorrhagic disease of the new-born is of frequent occurrence.
2. The disease depends upon changes in the blood which produce a delayed coagulation time and prolonged bleeding time.
3. We have a simple method for determining these factors.
4. Hemorrhages may be concealed; blood studies may give a clue to diagnosis earlier than other symptoms.
5. Blood therapy by subcutaneous injection is a simple and effective treatment, if employed early.
6. The coagulation and bleeding times should be determined in all new-borns presenting any symptoms.

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DISCUSSION

DR. MARTIN D. OTT, Minneapolis, Minn.: It has been my good fortune to see practically all the cases that Dr. Rodda has mentioned in his paper.

There are just a few points I wish to emphasize: first, as to the simplicity of the method itself. No special skill nor cumbersome apparatus is necessary. I am sure that when Dr. Rodda set out to devise the method he had no idea of devising a method which would give the accurate, scientific coagulation of the blood, but that of the new-born suffering with hemorrhagic disease. It has been very interesting to find that this has been just as accurate as the method accepted by White. The only factors necessary are the free flow of blood and absolute cleanliness. This has often been neglected in other methods and has caused them to fall into disrepute.

The apparatus is so simple it can be carried in any grip and takes no more room than the ordinary hypodermic outfit.

Cerebral hemorrhage is not uncommon, as Dr. Rodda pointed out, but the symptoms often do not point to any cerebral involvement. If hemorrhagic disease is present we have some idea of the process and if any untoward symptoms develop during the first few days of life we should make repeated examinations to determine if that condition is present.

Another important thing is using it as a guide to therapy. Heretofore, we have had no means of knowing when the therapy has been sufficient. When injections of blood have been repeated in some of the cases we have found that after one or two injections of blood the clotting time and bleeding time has returned to normal only to rise again the next day. It is important, therefore, to make repeated injections of blood or repeated blood studies to show when they should be repeated.

I think Dr. Rodda has made a very valuable contribution which, if carried out, will be instrumental in saving many thousands of babies in the future.

DR. J. C. LITZENBURG, Minneapolis, Minn.: This paper of Dr. Rodda's gives me no little satisfaction for the reason that the University of Minnesota was the first institution in America, and possibly in the world, to turn over the new-born child immediately after tying the cord to the pediatrician. Our reason for doing this was because we thought it was better for the child than to leave it with the obstetrician because the pediatrician was more interested in the child. I predicted at that time that because he was interested in the child he would probably make investigations that would increase our knowledge of the new-born. This paper of Dr. Rodda's bears out my point that the pediatricist, because he is a pediatricist, thinks in terms of the child and the obstetrician thinks in terms of the woman. We have heard a great deal in recent years as to child conservation. It seems to me very obvious that the best place to start this is in the beginning of child life. Too many babies are lost in the delivery room, or soon after delivery, so we are trying to improve obstetrics. We have heard much about prenatal care, but all this will be of no avail if the child is to die of hemorrhage soon after birth. I have had great satisfaction in seeing babies saved through this method of Dr. Rodda's that otherwise would have been lost.

I will cite just one case very briefly: A woman of forty-six was pregnant for the first time and probably her last chance to have a child. The child was born normally and was apparently in good condition, but soon the nurse reported that the child is passing bloody urine. Immediately the pediatricist was sent for and he injected whole blood and the baby was saved. This child passed such large amounts of blood and was in such precarious condition that repeated injections of blood were necessary. You can imagine my satisfaction in seeing the baby saved

by a method without which we would be entirely helpless, but can you imagine the satisfaction of the forty-six year old primipara with a fifty year old husband at the saving of the only child that they would probably ever have?

I do not know whether there are many here who realize that this is more or less of an epoch making paper. Not necessarily startling, but epoch making, because it is bringing to the attention of the profession a method simple and applicable by any one, a method that can be employed by the whole profession very easily. It is my practice in the University Hospital to turn the baby over to the pediatricist immediately after birth and in private practice I do the same thing. If there is anything the matter I want the pediatricist to see it. Suppose the child is bleeding from the cord, or from the urinary tract, or there are symptoms of cerebral hemorrhage, or what not. I have seen so many of these babies saved by these injections that I am very greatly impressed by this method, particularly so because it is a method that anyone can use. If you see any of these symptoms that I have mentioned you will find it of great value and any doctor can carry the two little watch glasses and the shot. Anyone can take the bleeding time. Dr. Rodda said that at the first symptom the bleeding and clotting time should be taken. That is my practice both at the hospital and in private practice to take the bleeding time in any case that has symptoms of hemorrhage, however obscure. We can stop them all.

I want to go a step further and make a prediction, and that is that it will be a very short time before it will be considered gross neglect not to take the coagulation time and the bleeding time in every baby at birth.

A PREOPERATIVE AND POSTOPERATIVE STUDY OF DIABETIC PATIENTS WITH SURGICAL COMPLICATIONS*

By D. M. BERKMAN, M. D.
Section on Medicine, Mayo Clinic
Rochester, Minnesota

In 1915 I published a short paper on diabetes based on the study of a series of twenty-six patients who came to operation with a total mortality of 7.7 per cent. Since I wished to learn if our results continued to bear out the conclusions made in 1915 I have made a study of a much larger series, and the findings compare favorably with those in the earlier report. In considering the low mortality rate four signi-

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ficient factors should be borne in mind: (1) we have been forced to operate on very few patients with acute diabetes before bringing the diabetes under control; (2) light ether anesthetics have been given by the open non-asphyxiating method; (3) we have adhered to a program of selection and have attempted to eliminate from surgical procedures patients who have been demonstrated impractical risks from the standpoint of diabetes; and (4) most of our patients have had a mild form of diabetes. On the other hand, a large proportion of the patients have had major operations for serious conditions.

If the literature is reviewed from the standpoint of vital statistics very few observations are found based on a series of cases large enough to be conclusive. In my previous paper I referred to the series of cases collected by Phillips from the literature in which there was a mortality of 17.7 per cent in cases previously treated for diabetes. In Karewski's series of 136 cases there was a mortality of 16 per cent. The mortality in part of this series was 20 per cent (Addis). The mortality in operations on infected tissue was 21.7 per cent, in operations on uninfected tissue, 11.8 per cent. Fitz has recently reported a 28.7 per cent mortality in a series of forty-five cases. The mortality rate among the infected cases was 50 per cent, among the noninfected cases it was 12 per cent. It is scarcely necessary again to call attention to the very apparent increase of risk when there is infection at the site of operation.

The series herein reported comprises 159 separate operations performed on 134 persons. There were eight deaths from all causes; two patients died in coma, presumably of diabetic origin. The mortality based on 159 operations was 5.03 per cent, 25 per cent in coma; based on 134 patients it was 5.97 per cent. I am including tables of the findings of the patients under discussion with the pertinent data (Tables 1 and 2). The classification of the severity of diabetes has been made with special care not to designate as severe, a case in which observation under a dietary regime did not reveal an exceptionally low carbohydrate tolerance.

Ether was administered 104 times; six of the

deaths were among this group of patients, a mortality of 5.76 per cent; local anesthesia was used fifty-three times; two of the deaths were in this group of patients, a mortality of 3.77 per cent. Nitrous oxid was used only once. One operation of minor nature was performed without anesthesia. Joslin states that ether is a burden which may be easily born by a mild diabetic, but may change a moderately severe to a severe case, and a severe case to a fatal case, and earnest attention should be given to this opinion. It is farthest from my purpose to advocate the general and indiscriminate use of ether on diabetic patients, and yet I venture to repeat a statement made in a former paper that even in the presence of diabetes ether given under proper conditions is the general anesthetic of choice. The experience of the anesthetist in giving general anesthetics, the degree and time of the anesthetic, and the workmanship of the operator play a great part in success or failure with this anesthetic. We have not used spinal anesthesia and our observation of its use elsewhere has not made us regretful. Gas oxygen also is not used generally by our surgeons. It is not satisfactory to the operator in abdominal cases, chiefly from the standpoint of relaxation and consistency of action. The French have made rather wide use of ethyl chlorid as a general anesthetic, administered by a mask, and Labbe mentions its special applicability to the diabetic. The administration of chloroform to the diabetic patient is hardly excusable. Local anesthesia, when applicable, carries its own recommendation.

Only eight patients in the series were classified as severe diabetics twenty-three were moderately severe, and 103 were mild. Curiously enough all the deaths occurred in the mild cases. One patient who came merely for throat trouble in the course of a routine general examination was discovered to have diabetes. A tonsillectomy under local anesthetic was performed without the usual preoperative observation so that aside from the definite diagnosis no diabetic data is available. This patient died in coma forty-eight hours after the removal of the tonsils. Death occurred in six cases as the result of varied postoperative complications

rather difficult to associate directly with diabetes. It might be conjectured that in the two pneumonia cases resistance to the infection was lowered by a preexisting diabetes. The gas bacillus infection which occurred following a resection of carcinoma of the rectum seems to have been an accident unaffected by diabetes. The remaining three deaths are hardly open to discussion except from the standpoint of general surgical risk. With the exception of the death from tonsillectomy the deaths occurred in a group of cases in which the surgical risk would be appreciable without the presence of diabetes (Table 2).

If a detailed classification of the surgical conditions found in diabetic patients is attempted it may become rather complex. We find various and not necessarily conflicting ideas in the literature. Falta describes surgical conditions which tend to or already do bear a relationship to diabetes and those which do not. As a simple broad classification from one view point this has an attraction. His description of the first group carries no implication relative to the cause of diabetes, but catalogs these surgical diseases as potential influences on diabetes. I should include in the first group all infectious conditions, including furuncle, carbuncle and gangrene, mentioned by him, and all definite affections of the gallbladder, bile passages or pancreas, and diseases of the thyroid. Our series included fourteen cholecystectomies, one cholecystostomy, one cholecystogastro-enterostomy for carcinoma of the pancreas, and one choledochotomy for stones in the common duct and pancreas. Our general impression has been that following a successful operation for conditions such as these just described the tendency has been toward improvement of the diabetes. It is also of interest to note that twenty-five patients of the series were operated on for diseases of the thyroid. Eight had exophthalmic goiters and seventeen had adenomas of the thyroid. Another grouping which appeals to me as rather essential divides the surgical conditions into the vital and the nonvital, with absolutely no relation to major or minor surgery. The first group comprises those conditions threatening the life or fundamental health of the patient immediately or

ultimately. Strouse mentions a classification of the emergency and nonemergency operations. This is rather important from the standpoint of its relation to preoperative treatment. I believe with Strouse and Fitz that delay may prove dangerous in acute infection, and if the infection is definitely shown seriously to disturb metabolism preoperative dietary measures are often unavailing and in fact add to the surgical risk.

In which diabetic patients do we expect the greatest hazard? Our mortality in operations on infected tissue was 8 per cent, and on non-infected tissue 4 per cent. Such conditions as nephritis, arteriosclerosis, old age, and obesity will contribute to the surgical hazard in proportion to their degree. To these may be added cardiac and circulatory diseases, debilitation from any cause, and the gravity of the surgical situation itself although unattended by any complication.

The majority of our diabetic patients coming to operation had the disease in a mild form, that is, their tolerance under a few days' management in shown to be 80 gm. or higher. Our first purpose in the preoperative treatment is to make careful investigation for associated conditions and complications, especially infections and renal disturbances, and second to render the urine free from sugar as rapidly as possible, establish tolerance roughly, bring the diet back to a maintenance caloric value and be sure the patient is free from acidosis. The details of this procedure in general are common knowledge; we are closely following the Joslin methods. Special attention is given to the number of days of starvation necessary to clear the urine of sugar, as well as the general effect on the patient of radical manipulation of the diet. Patients whose urine clears slowly and who complain of marked weakness and other distressing symptoms while starving are, if circumstances permit, carried on medical treatment for several weeks before being sent to the operating room.

We frequently are able to bring a patient to a satisfactory maintenance diet without reaching his carbohydrate tolerance. These patients may be saved considerable time as it is not necessary to drop back to a low diet and

again bring it up. The maintenance diet is kept up for several days, probably averaging about a week, after which, other things being satisfactory, the patient is transferred directly to the operating room. There is no fixed time limit to any part of the preoperative treatment, and the question of time is largely dependent on the aspect in the individual case.

Our requirements of the diabetic patient before operation are not new or different. We wish his urine to be free of sugar and that he show no sign of acidosis after he has been for several days (from five to seven) on a diet very low in fat and containing a sufficient caloric value to supply his needs while he is at rest. This requirement is not entirely an arithmetic calculation. I have seen diabetics who require at the least thirty calories to the kilo of weight, and I have had a moderately severe diabetic on half day and at times full day orderly duty for weeks on a diet which did not quite supply fifteen calories to the kilo. He maintained his nutrition and was fairly comfortable although he complained of weakness and slight dizziness.

Our routine urinalysis, aside from the ordinary tests, consists in the quantitative and qualitative analysis for sugar, the ferric chlorid test for diacetic acid, and the estimation of the total quantity of ammonia in the twenty-four hour specimen. A patient who excretes more than 1.5 gm. of ammonia, or shows a positive ferric chlorid reaction, should have more prolonged treatment. During the past year we have used routinely also the determination of the carbon dioxid of the blood plasma as an index to acidosis. Foster has stated that blood sugar is the index to diabetes. Although we have been determining the percentage of blood sugar for several years we have found it of especial value only in a very few cases in which we discovered that the blood sugar remained persistently high after the urine had become sugar free. We have not looked with favor on this type of patient as a surgical risk although one recent patient, not in the series reported, was dieted with the blood sugar as the sole index, and finally had an amputation of the leg for gangrene. This woman had a previous history of diabetes; our tests showed no sugar in the urine but 0.3 per cent of sugar

in the blood. There was some evidence of a kidney lesion but her kidney function was proved to be good. She passed safely through the operation.

In my former paper I mentioned our routine use of sodium bicarbonate, but for at least three years we have not used sodium bicarbonate for our surgical diabetics and, in all candor, we see absolutely no consequent difference in the behavior of these patients during operation or in their postoperative convalescence. This about-face in our practice was due to Joslin's opinion that large doses of sodium bicarbonate are frequently detrimental to patients with threatened coma. Our great ally is fluid, by mouth, by rectum, and subcutaneously or intravenously, but fluid in some form immediately the patient leaves the operating table and pushed until the end of forty-eight hours or longer if thought necessary. All patients with signs of acidosis or threatened coma should receive 1000 c.c. of fluid during every six hours. For the first day or two orange juice up to 250 c.c. or 300 c.c. a day has proved a very acceptable and satisfactory form of food. We have found it beneficial as a source of carbohydrate to patients who have a tendency to acidosis. This has been especially true in young children who have reacted rather unfavorably to starvation longer than forty-eight hours. From this point on, our postoperative treatment has not differed greatly from our preoperative. Tolerance is again established and the patient is placed on a strictly medical regime which has for its object the education of the patient to a point where he may assume the responsibility of his future treatment.

Answers to questionnaires have been received from seventy-six of the 126 patients who recovered from operation and returned home. These replies were written from six months to five years following operation. Twenty-two patients died within an average of eighteen months after operation; six of these are reported to have died of diabetes, the remainder from various causes, several during the influenza epidemics. Forty-six of the remaining fifty-four patients consider themselves cured of the condition for which they were operated, six are considerably improved, and two report

no improvement. All but three or four are continuing more or less successful efforts at dieting, their successes depending a great deal on the circumstances in which they are obliged to live.

CONCLUSIONS

One hundred fifty-nine operations of all kinds have been performed in the Clinic on diabetic patients with a mortality of 5.03 per cent. Ether was administered 104 times, with a mortality of 5.76 per cent. The mortality in operations on infected tissue was twice as great as on uninfected tissue, and, judging from the literature, this is the usual ratio. Sixty-eight per cent of the seventy-six patients operated on, from whom we have heard, have obtained relief from various crippling, health-destroying and life-menacing conditions from which they were suffering aside from their diabetes.

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TABLE NO. 1
One hundred and fifty-nine operations on diabetic patients.

Case	Age	Sex	Degree of diabetes	Operation	Sepsis	Anesthetic
115441	50	F	Mild	9-22-14 Ligation left superior thyroid artery 9-29-14 Ligation right superior thyroid artery 5-19-15 Thyroidectomy	0 0 0	Local Local Ether and local
119774	58	F	Moderately severe	12-22-14 Enucleation right eye, Percy cautery to orbit for extensive cancer involving lids, canthus and eyeball 8-17-15 Excision with Paquelin cautery two small epitheliomas outer canthus right eye	0 0	Ether Local
143189	33	M	Moderately severe	1-16-15 Ligation left superior thyroid artery 1-21-15 Ligation right superior thyroid artery 12-14-15 Thyroidectomy	0 0 0	Ether Local Ether
122620	44	M	Mild	1-22-15 Ligation left superior thyroid artery 1-29-15 Ligation right superior thyroid artery 5-14-15 Thyroidectomy	0 0 0	Local Local Ether and local
122798	53	F	Moderately severe	1-29-15 Cholecystostomy, drainage pancreatic cyst	0	Ether
123150	46	F	Mild	2- 1-15 Choledochotomy, cholecystectomy, appendectomy 2-11-15 Choledochotomy, removal stones 6-14-17 Choledochotomy, removal stones	+ + 0	Ether Ether Ether
124214	36	M	Mild	2-27-15 Posterior gastrectomy for duodenal ulcer	0	Ether
126765	55	M	Moderately severe	3-29-15 Circumcision, hemorrhoidectomy	0	Local
129852	60	F	Severe	5-20-15 Extraction of cataract with iridectomy, left eye,	0	Local
129873	64	F	Mild	5-25-15 Cholecystectomy	0	Ether
131911	39	F	Mild	6- 1-15 Tonsillectomy	+	Local

* Patient died in hospital.

Table No. 1—(Continued)

Case	Age	Sex	Degree of diabetes	Operation	Sepsis	Anesthetic
131543	66	F	Mild	6- 9-15 Radical amputation of breast for cancer	0	Ether
132286	42	F	Mild	6-11-15 Cholecystectomy, appendectomy	0	Ether
133451	31	M	Moderately severe	6-28-15 Inguinal herniotomy	0	Ether
133835	44	F	Mild	6-30-15 Abdominal hysterectomy, fibroid uterus	0	Ether
134005	47	M	Moderately severe	7- 7-15 Excision of cancer of right brow	0	Local
133918	58	F	Mild	7- 7-15 Removal of double ovarian cyst, both ovaries and tubes; appendectomy	0	Ether
130169	55	F	Severe	7- 8-15 Thyroidectomy	0	Ether
134774	63	F	Mild	7-12-15 Mikulicz-Hartman-Bilroth No. 2 for cancer of the stomach	0	Ether
769	49	F	Mild	7-27-15 Herniotomy, umbilical hernia	0	Local
136721	62	M	Mild	7-31-15 Suprapubic drainage of the bladder	0	Local
138001	53	F	Severe	8-20-15 Thyroidectomy	0	Local
141126	59	M	Severe	10-14-15 Tapping of hydrocele	0	Local
146905	44	F	Mild	12- 9-15 Excision of tumor submaxillary glands, cancer	0	Local
147832	42	M	Moderately severe	12-22-15 Hydrocele	0	Ether
147472	26	F	Mild	12-28-15 Appendectomy	0	Ether
149076	55	F	Moderately severe	1-25-16 Exploration, general cancer	0	Ether
150542	35	F	Moderately severe	2-18-16 Cholecystectomy	0	Ether
152350	52	F	Mild	3- 9-16 Thyroidectomy	0	Ether
62967	49	M	Mild	3-15-16 Gastro-enterostomy for duodenal ulcer	0	Ether
154837	55	F	Mild	3-25-16 Thyroidectomy	0	Ether
154524	17	M	Mild	3-28-16 Appendectomy	0	Ether
154245	55	M	Severe	4- 3-16 Cholecystectomy	0	Ether
156163	50	F	Mild	4-10-16 Tonsillectomy	+	Local
157981	55	M	Mild	5- 3-16 Cholecystectomy	+	Ether
158189	68	M	Mild	5-13-16 Circumcision	0	Local
159072	50	M	Mild	5-24-16 Cataract, right eye	0	Local
160174*	29	M	Mild	5-26-16 Tonsillectomy	+	Local
154378	54	F	Mild	5-30-16 Thyroidectomy 6-14-16 Herniotomy, umbilical hernia enucleation fibroid of cervix	0 0	Ether Ether
161937	31	M	Mild	6-20-16 Tonsillectomy	+	Local
163419	60	M	Mild	6-28-16 Hydrocele	0	Ether
160363	56	F	Mild	7- 4-16 Right nephrectomy, hypernephroma	0	Ether
162827	41	M	Severe	7-10-16 Ligation left superior thyroid artery 7-14-16 Ligation right superior thyroid artery	0 0	Local Local

* Patient died in hospital.

Table No. 1—(Continued)

Case	Age	Sex	Degree of diabetes	Operation	Sepsis	Anesthetic
162661	60	F	Mild	7-12-16 Perineorrhaphy	0	Ether
163382	40	M	Mild	7-14-16 Pyloroplasty for duodenal ulcer	0	Ether
170710	70	M	Mild	9- 1-16 Removal sequestrum right femur	+	Ether
170844	33	F	Mild	9- 5-16 Ligation left superior thyroid artery 9-11-16 Ligation right superior thyroid artery	0 0	Local Local
172215	57	M	Mild	9-14-16 Cholecystectomy, appendectomy	0	Ether
171566	64	M	Mild	9-21-16 Sick operation for hydrocele 3-12-19 Extraction cataract right eye	0 0	Local Local
172978	58	M	Mild	9-26-16 Thyroidectomy	0	Ether
124544	57	F	Mild	9-27-16 Hysterectomy, cancer uterus	0	Ether
55399	43	M	Mild	10-27-16 Tonsillectomy	+	Local
175259	19	F	Mild	11- 1-16 Appendectomy	+	Local
176239*	55	F	Mild	11- 3-16 Thyroidectomy	0	Ether and local
170213	39	F	Moderately severe	11- 8-16 Abdominal hysterectomy	0	Ether
179567	57	F	Mild	12-20-16 Cholecystectomy	0	Ether
180444*	61	M	Mild	12-26-16 Herniotomy, inguinal	0	Local
183072	34	F	Mild	1-18-17 Bunion removed, right foot	0	Ether
182594	59	M	Mild	1-22-17 Submucous resection	0	Local
183515	59	F	Mild	1-29-17 Abdominal hysterectomy, cancer of uterus 2-15-17 Cholecystectomy	0 0	Ether Ether
183967	39	M	Mild	2- 8-17 Right herniotomy	0	Local
184721	33	F	Mild	2-21-17 Ligation left superior thyroid artery 3- 2-17 Ligation right superior thyroid artery 7-10-17 Thyroidectomy	0 0 0	Local Local Local
189767	53	F	Mild	4- 5-17 Amputation of left breast for cancer 4-21-17 Subtotal abdominal hysterectomy, appendectomy	0 0	Ether Ether
190768	59	M	Mild	4-19-17 Abdominal exploration, sarcoma mesentery	0	Ether
189925	48	M	Mild	4-21-17 Submucous resection	0	Local
191185	59	F	Mild	4-26-17 Cautery to cervix, polyp	0	None
192082	53	M	Mild	5- 8-17 Cholecystectomy, appendectomy	+	Ether
192580	51	F	Mild	5-12-17 Curettage, jaw, osteomyelitis	+	Ether
194296	50	M	Mild	5-19-17 Tonsillectomy	+	Local
192996	55	F	Moderately severe	5-29-17 Cholecystectomy	0	Ether
194400	62	M	Mild	5-21-17 Talma-Morison operation	0	Ether
194132	43	F	Mild	6- 5-17 Abdominal hysterectomy	0	Ether
200025	51	M	Mild	6- 6-17 Manipulation, shoulders	0	Ether
194569	54	F	Mild	6- 8-17 Cholecystectomy	0	Ether
196067	54	F	Mild	6- 9-17 Tonsillectomy	+	Local

* Patient died in hospital.

Table No. 1—(Continued)

Case	Age	Sex	Degree of diabetes	Operation	Sepsis	Anesthetic
197888	30	M	Moderately severe	6-16-17 Enucleation left eye	0	Local
133835	44	F	Mild	6-26-17 Subtotal abdominal hysterectomy 7- 9-17 Cholecystectomy	0 0	Ether Ether
196666*	20	M	Mild	6-29-17 Thyroidectomy	0	Ether
201643	44	F	Mild	8- 4-17 Thyroidectomy	0	Ether
204158*	46	M	Mild	8-13-17 Kraske, cancer of the rectum	0	Ether
209420	50	M	Mild	10-10-17 Amputation of right breast for cancer	0	Ether
214896	3	M	Severe	11-24-17 Drainage, submental abscess	+	Ether and local
210583	53	F	Mild	11-30-17 Thyroidectomy 11-27-18 Vaginal hysterectomy perineorrhaphy	0 0	Ether Ether
192303	59	F	Moderately severe	12-13-17 Perineorrhaphy	0	Ether
216332	44	M	Mild	1- 2-18 Excision lipoma of neck	0	Ether
219323	57	M	Mild	2- 9-18 Cholecystogastrostomy, cancer of pancreas	0	Ether
221020	48	F	Mild	2-12-18 Splenectomy, splenic anemia	+	Ether
223203	54	F	Moderately severe	3- 9-18 Vaginal hysterectomy	0	Ether
226214*	57	M	Mild	4-10-18 Suprapubic cystostomy	+	Local
226665	33	F	Mild	4-18-18 Appendectomy	0	Ether
227529	64	M	Mild	4-20-18 Amputation toe, gangrene	+	Local
230597	57	F	Moderately severe	6-14-18 Thyroidectomy	0	Ether
227684	54	F	Mild	6-19-18 Double cataract	0	Local
221951	56	M	Mild	7- 5-18 Herniotomy, inguinal	0	Ether
39692	41	F	Mild	7- 9-18 Thyroidectomy	0	Ether
236692	50	M	Mild	7-15-18 Cataract, right eye	0	Local
238199	62	F	Moderately severe	7-17-18 Drainage of abscess, toe	+	Local
225159	66	F	Mild	7-31-18 Cataract, right eye	0	Local
238868	53	F	Moderately severe	8- 7-18 Cholecystectomy 8-20-18 Excision portion of right breast	+	Ether
243207	59	F	Mild	9- 2-18 Hysterectomy, fibroid	0	Ether
242720	23	F	Mild	9- 3-18 Cholecystectomy, appendectomy	+	Ether
244151	20	F	Mild	9-10-18 Dilatation and curettage	0	Ether
245930	57	F	Mild	9-25-18 Herniotomy, ventral hernia	0	Ether
248120	50	F	Moderately severe	10-23-18 Thyroidectomy	0	Ether
248296	69	M	Mild	11- 8-18 Cataract, right eye	0	Local
251508	57	F	Moderately severe	12- 5-18 Hysterectomy	0	Ether
253042	38	F	Mild	12-20-18 Cholecystectomy, appendectomy	+	Ether

* Patient died in hospital.

Table No. 1—(Continued)

Case	Age	Sex	Degree of diabetes	Operation	Sepsis	Anesthetic
254250	43	F	Mild	12-28-18 Hysterectomy, prolapse	0	Ether
256509*	62	M	Mild	2- 3-19 Permanent colostomy, cancer of rectum 2-10-19 Posterior excision, rectum	0 0	Ether Ether
259627	68	F	Mild	2-25-19 Subtotal hysterectomy, ovarian cyst	0	Ether
259876	33	F	Mild	3- 7-19 Perineorrhaphy	0	Ether
262002	69	M	Mild	3- 8-19 Suprapubic stab for bladder drainage 11-24-19 Prostatectomy, hypertrophy	0 0	Ether Ether
265477	54	F	Mild	4- 9-19 Vaginal hysterectomy	0	Ether
268038*	39	M	Mild	4-29-19 Herniotomy, umbilical hernia	0	Ether
269070	44	M	Mild	5- 7-19 Combined extraction, cataract, right eye	0	Local
268790	59	M	Mild	5-10-19 Division posterior root right gasserian ganglion	0	Ether
269194	57	F	Moderately severe	5-21-19 Vaginal hysterectomy	0	Ether
271274	53	F	Mild	5-31-19 Thyroidectomy	0	Ether
274742	54	F	Mild	6-16-19 Extraction of teeth	+	Nitrous oxid
274621	64	M	Mild	6-26-19 Amputation penis, cancer	0	Local
201144	69	M	Mild	6-27-19 Amputation toe, gangrene	+	Local
276951	66	M	Mild	7-17-19 Circumcision	0	Local
282214	54	M	Mild	8- 7-19 Ligation left superior thyroid artery 8-13-19 Ligation right superior thyroid artery 12-16-19 Thyroidectomy	0 0 0	Local Local Ether
280168	54	F	Moderately severe	8-13-19 Thyroidectomy	0	Ether
238875	35	F	Mild	8-26-19 Vaginal hysterectomy, prolapse	0	Ether
285951	57	F	Mild	9-12-19 Thyroidectomy	0	Ether
288094*	58	F	Mild	10- 1-19 Thyroidectomy	0	Ether
288735	33	M	Mild	10- 1-19 Removal of stones of the pancreas, choledochotomy, removal of stones from common duct, cholecystostomy	0	Ether
287671	67	F	Moderately severe	10- 3-19 Amputation left breast for cancer	0	Ether
12578	48	F	Severe	10- 8-19 Combined extraction, cataract, right eye	0	Local
288864	44	F	Mild	10- 9-19 Thyroidectomy	0	Ether
247983	52	F	Mild	10-11-18 Combined extraction cataract, right eye 12- 4-19 First stage Mikuliez operation, cancer rectosigmoid	0 0	Local Ether
291313	36	M	Mild	10-14-19 Bilateral herniotomy	0	Ether
291868	51	F	Mild	10-23-19 Amputation left leg, gangrene	+	Ether

*Patient died in hospital.

TABLE NO. 2
Diabetic deaths in the hospital

Case	Age	Sex	Operation	Cause of Death	Anes- thetic	Days after operation	Degree of diabetes	Sepsis	Associated Condition	Necropsy
76239	55	F	Thyroidectomy	Bronchopneumonia	Eth er	3	Mild	0	Thyroid toxemia, myocarditis	+
66666	20	M	Thyroidectomy	Bronchopneumonia and myocarditis	Ether	2	Mild	0	Thyroid toxemia, myocarditis	+
4158	46	M	One stage Kraske for carcinoma of rectum	Diabetic coma	Ether	4	Mild	0	0	0
40174	29	M	Tonsillectomy	Diabetic coma	Local	2	Mild	+	Multiple sclerosis	+
28214	57	M	Suprapubic Cystostomy	Pyelonephritis	Local	52	Mild	+	Prostatic bladder retention, marked cystitis, low kid- ney function	+
8038	39	M	Umbilical herniotomy	Bilateral pulmonary fat embolism	Ether	6	Mild	0	Marked obesity	0
5506	62	M	Permanent colos- tomy and poster- ior excision of rectum and anus for cancer of rec- tum	Gas bacillus septicemia	Ether	28	Mild	0	Moderate cachexia	0
8094	58	F	Thyroidectomy	Bronchopneumonia	Ether	5	Mild	0	Thyroid toxemia	+

DISCUSSION

DR. EDWARD L. TUOHY, Duluth: It is to be regretted that Dr. Rowntree could not show his slides consecutively because he possesses a great fund of information and has had a large experience in the handling of these cases.

To my mind the average physician is easily overawed by the intricacies of the problem, and like many other technical procedures it is not so difficult when once actually started. From my own point of view, I have come to look on the handling of diabetes as being entirely satisfactory, where as formerly I looked back on it as being a sad event when anybody presented himself with that disease, chiefly for the reason that these patients did not seem to follow directions long enough to get more than transitory relief. Therefore, it seems that whatever else Joslin may have done, the feature of instruction of the patients and his relatively simple means of teaching them in classes has been an enormous step in advance. I have strongly recommended to those who are interested to get a series of his dietary directions and follow them out.

I recall a woman who had been in one of Joslin's classes for over a year and who moved to Ely, Minnesota. In speaking to that woman I found that she knew more about handling diabetes than anybody else I have ever met. She reminded me in a measure of a mother who has raised a sickly infant after following the plausible directions of a good pediatrician. She is oftentimes much better qualified to handle the

infant than the doctor with a prescription blank in his hand and a desire for speed paramount.

The situation I would like to ask Dr. Rowntree about is this: Since we have come to examine the blood for sugar and to study the situation of general metabolism, it seems to me we have run into one danger. Where are we going to draw the line in diagnosing renal glycosuria or draw the line in determining that the presence of sugar in the urine is only an incident in chronic interstitial nephritis or some disturbance of the glands of internal secretion.

Not long ago in one of his writings Joslin stated that renal glycosuria was an extremely rare condition, and that if these patients were followed long enough most of them would develop clinically diabetes. This is a matter of great importance because I have in mind two men who were advised by excellent clinicians to disregard their diet, although they had had glycosuria.

Some of the nerve men should discuss early changes which occur in the nervous system productive of weakness, malaise, paresthesias, a feeling of numbness, and what not, in diabetics. These two men complained not of polydipsia or of polyuria but complained of their limbs. These patients were very easily controlled. Their food tolerance was very high, and still on occasions they will have glycosuria. I would like to know for my own satisfaction how safe are we in telling any of these patients they are not in danger; that they do not need to watch their diet early. There must be a beginning in all condi-

tions, and what Dr. Rowntree has said is all very true. We ought to be interested in the early manifestations of the disease, and the earliest manifestations, as Mackenzie has pointed out, are indefinite. A close study of the subjective feelings must come into the foreground and be given the keenest analysis, particularly when we study diabetes from the standpoint of the general health. In the preliminary survey of every diabetic we should analyze his complete physical state, including the cardiovascular and the nervous systems. A very broad and intensive general examination is absolutely essential.

DR. HARRY B. ZIMMERMANN, St. Paul: One of the startling features in Dr. Berkman's paper is his low mortality. I am quite sure, although mine are not available, they must be higher.

One of the most interesting things I have recently seen on this subject is an assertion by Dr. Foster of New York that 70 per cent of all diabetics die following surgical operation. This illustrates the extreme susceptibility of diabetics to surgical complications and there is no doubt but that the diabetes is an important factor in the mortality of these cases. I have always felt that one should not operate on a diabetic, even after he has been put in the best possible condition by medical means, unless the surgical condition from which he is suffering is a greater menace to his life than the operation would be.

A great many of Dr. Berkman's cases were glycosurias associated with hyperthyroidism. These are not real diabetics and their faulty sugar metabolism is usually corrected when the excess of thyroid secretion has been removed.

With regard to anesthesia, theoretically ether anesthesia is not the anesthetic of choice. It has been proven that ether in itself, even when given with a minimum of asphyxiation, increases the H-ion concentration in the blood and asphyxia also tends to increase it, so if ether is given it should be given with extreme care with the least possible asphyxia. The post-operative vomiting so often associated with ether anesthesia precludes the post-operative treatment suggested by Dr. Berkman, namely the giving of excessive quantities of fluid. Of the general anesthetics, gas and oxygen is theoretically a better anesthetic than ether because gas gives a minimum of increased H-ion concentration.

When one is not operating on infected tissue, local anesthesia is the best. These patients have a certain amount of trophic disturbance and are quite susceptible to infection. It is my opinion that the trauma produced by a local anesthetic has a tendency to invite infection.

One occasionally sees cases in which the surgical condition seems primary in the production of the glycosuria. I recently operated on a woman of sixty-five with evidences of a cholelithiasis with a common duct obstruction. During the time that her common duct was obstructed she would run about six per cent sugar in her urine. Upon relief of the obstruction, she would be sugar free. The last time I saw her

it was necessary to operate to relieve the common duct obstruction and in spite of the fact that we got her sugar free by the Joslin treatment, she died three days after the operation in coma.

DR. R. E. FARR, Minneapolis: The subject has been so beautifully and thoroughly covered in its fundamentals that I shall only speak of one or two practical points. So many things are admitted that they do not need discussion—that is, preparation of the patient, in the first place, and, in the second place, the cases we should operate on. Of course, no one will do an operation upon a diabetic unless it is considered absolutely necessary. These things are pretty well settled.

One thing which I think is admitted by all is that a certain amount of lowering of the alkaline reserve takes place with all anesthetics, most with chloroform, next ether, then gas, and especially if the latter is poorly given.

With novocain, comparatively little work has been done on its relation to the alkaline reserve. For a year and a half Dr. M. E. Rose has been doing this work for me but our number of cases is so small, and statistics count for so little, that I hesitate to give the results. I want to leave this thought with you: Statistics and investigation show that novocain does less to lower the alkaline reserve than any other known anesthetic. It is surely admitted that we can do an operation under novocain with less injury to the patient's economy than can be done in any other way. The whole argument centers on whether or not we can do an operation under novocain anesthesia, with efficiency. If we do less trauma to the economy we have an argument in favor of using this anesthetic purely from a physical sense in our diabetics. I do not know enough about the scientific side of it to speak from my own knowledge, but, if the acidosis can be reduced, why should we not use in a diabetic, an individual predisposed to acidosis, the anesthetic that we know will do the least to raise the alkaline reserve?

I have been fortunate in my work on diabetics, but my number of cases is so small, compared with the number reported, that it would be absurd to present them, and they do not prove anything, anyway. A good deal would depend on how one selects his cases. In cases which are not infected I have not found infection to take place more often in diabetic cases than in any other class of people. In infected cases novocain does not increase the infection because one may do nerve blocking and, in most of these operations, we can resort to regional anesthesia and the novocain will have no more effect than as though we injected blood serum. You can do an amputation of the leg with nerve blocking six inches above the site of amputation and, in two days, you cannot tell where the anesthetic was given.

DR. J. W. ANDREWS, Mankato: These cases that are most difficult to treat are of the greatest interest to us as physicians. It is not difficult to diagnose

diabetes mellitus, but when we come to the treatment it is a great problem.

I was impressed with many of the remarks made by Dr. Rowntree in the presentation of his paper, but more especially with the remark that we should have our patients in a hospital, and I want to emphasize that point. I have noticed in the treatment of these cases that those I had in a hospital and under training and under good nursing got along better and remained sugar free longer than those whom I had to treat at their homes. I have in mind one patient in a neighboring town in whose case I made a diagnosis of diabetes about three years ago. She came to consult me for something else and I found she had diabetes. When I announced that fact to her she wanted the best treatment that was known. I put her on the Allen treatment modified somewhat by the Joslin treatment. She became sugar free in a short time and remained so for weeks. Then it reappeared, not in any considerable amount. I put her on the treatment again and she remained sugar free for a number of months. A few days ago I received a specimen of her urine for examination and found it contained a large amount of sugar. I also received a letter from her stating that she had been feeling so well that she had been using all kinds of diet, sweets of all kinds, etc. Here is a fact: We can temporarily cure diabetes with this treatment that is under discussion here this morning, but I want to emphasize the word temporary. When we send these patients out sugar free, as we can in a large majority of cases, if they are not kept under observation the sugar will return. If they are not dieted to a limited extent the sugar will return and we have got the work to do over again. I hope that some one—and it may remain for our splendid man Dr. Rowntree to do it—will discover something that will permanently cure this distressing and so often fatal disease.

DR. HARRY A. BAKER, Minneapolis: I hesitate to enter into the discussion because of a limited clinical clientele, but take courage from the fact that oftentimes from a small number of cases that one has observed over a long period of time, one may gather data and information that might prove of value. This is particularly true of diabetes where patients seem to conveniently and at will present the symptoms of any disease that one would care to investigate, and where too, pharmaceutical houses with pamphlets and detail men with pills are always glad to furnish any knowledge that may be lacking.

I must differ somewhat with Dr. Rowntree in the statement that diabetes is incurable. Diabetes is curable, but with qualifications; it is curable as the inebriate is curable; as the drug habitue is curable; as tuberculosis is curable; firstly, by institutional treatment as has been outlined, where the benefits of psychiatrics as well as dietetics may be obtained; secondly,—and this is very important—rather than with follow up and later observations of recurrences, by a return wherever possible to an occupation and

an environment different from that in which the original disorder was contracted.

To my mind, glycosuria in whatever form save experimental, whether so called alimentary or renal, is incipient diabetes, or at least evinces a diabetic predisposition. I have never, either from clinical observation or a review of the literature, been able to directly connect the kidneys with diabetes save in the presumptive evidence of sugar in the urine. We must remember that the normal kidneys will filter out anything in the blood that ought not to be there, to the limits of their capacity, that they serve purely as internal emunctories and are neither the cause nor are they effected by the presence of sugar in the blood but rather a persistent hyperglycemia has a deleterious or toxic effect upon other tissues, namely nerve tissues and nerve centers, with possibly distant trophic disturbances.

The term diabetes is as antiquated as is consumption for tuberculosis. It signifies nothing save in its derivation being the name of a beautiful flower, the sweet pea. It suggests nothing either in etiology or treatment save perhaps desecration by diet, whereas it is equally if not more amenable to a psychotherapeutic. It carries with it in the mind of the patient the morbid psychology of an incurable ailment; a morbid psychology that handicaps therapeutics even more so than in Klebs, for while there is always hope in the tubercular, the diabetic sees nothing ahead but the bete noir of diet and restrictions. It would seem advance both for study and treatment, to consider all these cases either as incipient or advanced, true or false glycosurias.

It is a matter of much interest that these patients improved under the Doctor's treatment. The findings coincide with war reports from abroad that glycosurias were benefited too, by a military regime. That to me is one of the most important if not the most important simple, general medical truth that has been brought out by the war: the fact that regimen, including as it does, standardization of food, hours of work and time for play, is conducive to good health; a truth that is particularly timely and applicable in our own country, since the equally important economic fact is being demonstrated that liberty unless tempered with discipline and under certain restraint favors functional disorders and prepares the soil for nerve lesions.

There are several things of which I am wholly convinced: that diabetes is not a disease but a disorder; that there is no organic pathology but rather a glandular derangement; that the glandular triad involved is the pancreas, thyroids and adrenals; that the etiological factors of both glycosuria and Graves' are the same: predisposition and stress; that the right combination of both result in one disorder or the other. The glandular triad may be likened to the carburetor of an automobile: too rich a mixture or too lean a mixture, and the flivver spits, chokes and backfires; but give it just the correct mixture and Henry is himself again.

DR. L. G. ROWNTREE, Rochester (closing the discussion on his part): I have greatly appreciated this discussion. The question raised by Dr. Tuohy,—"How are we going to make a diagnosis in diabetes mellitus?"—is extremely important. Certainly in every case a routine physical examination and a careful history and repeated urinalyses are necessary.

The etiology, i. e., whether or not it has its origin in the pancreas, has to be taken into consideration in every case.

In reference to Dr. Baker's remarks, I feel that the kidney is probably the least important organ to come into consideration. Of course, we know that we get glycosurias in disease of the pituitary, in diseases of the liver, quite frequently in diseases of the thyroid, and often in diseases of the adrenals, or subsequent to the administration of adrenalin. Dr. Braasch and I observed a case together some two weeks ago, possibly a hyper-nephroma, with 6 per cent sugar in the urine. Obviously, a careful examination is most important.

In the treatment of diabetes the first essential is common sense. In the last case mentioned no attempt whatsoever was made to render the patient sugar free. Such an attempt, in the presence of this growth, would have endangered life, or enervated the patient so that we should never have gotten him out of bed again.

There is no question at all but that renal glycosuria is one of the rarest of diseases. I have seen only two cases. Instances have been reported in the literature from time to time, but a careful analysis throws out most of them. We diagnosed this renal glycosuria on the grounds presented.

I do not believe that true pancreatic diabetes is curable. In my paper I instanced a family type in which for a period of two to two and a half years, on an almost unrestricted carbohydrate diet, there was no recurrence of the glycosuria. There may be rare types that will respond to treatment, and in some cases the glycosuria may disappear permanently. But, in true pancreatic diabetes mellitus, I feel that it is a mistake to think we have effected a cure. We may have cured him, as Dr. Andrews says, temporarily, and in my experience of at least 200 cases in the last five years recurrence of glycosuria has been the constant rule.

In regard to Dr. Zimmerman's discussion, I feel as he does, that we need more information concerning acidosis from all forms of anesthesia. Dr. Farr has also indicated the same thing.

I want to congratulate Dr. Berkman on his contribution, since it is one of great importance. We all have had a great fear of ether in these cases. We have the experimental proof that small amounts of ether administered in normal saline to a normal animal, will produce glycosuria. King, of Baltimore, introduced intravenously dilute solutions of ether with the constant appearance of sugar in the urine. In contradistinction to this, we have from the Mayo Clinic incontrovertible evidence that in properly selected cases of diabetes mellitus which are handled

wisely prior to operation, the judicious use and skillful administration of ether permits skillful surgery to rid the patient of serious surgical complications and with a very low mortality.

Dr. Berkman laid emphasis in the proper place in regard to the handling of these cases for surgical procedures. The use of water is tremendously important, not only in surgical, but medical cases. During the period of starvation the forcing of water is one of the most important considerations.

In relation to Dr. Baker's discussion concerning the origin of the word, it is interesting to know that the word "Diabetes" was introduced in the second century by Araetus the Cappodocian, and signifies a syphon. He considered diabetes a form of dropsy in which "the defluxion is determined to the kidney and bladder", thereby differing from the ordinary forms of dropsy. The word "mellitus" comes from Willis, who determined the presence of a sweet body in the urine from its taste, differentiating for the first time diabetes mellitus and diabetes insipidus, the latter not having a sweet taste and therefore being insipid. The presence of sugar was demonstrated in the urine a year later by Hodgson.

DR. D. M. BERKMAN, Rochester (closing the discussion): I wish to correct a misapprehension which arose in connection with the presentation of my paper. I mean that ether is the choice when a general anesthetic is indicated. I believe with Dr. Farr that when applicable, local anesthesia is really the anesthetic of choice. Any anesthesia, as he has stated, is limited in its possibilities by what the operator can do with it. Dr. Farr's experience with local anesthesia gives him the right to tell us a great many things about its use. In choosing an anesthetic it is a question of perfection of the operation which is to be attempted. Our mortality rate has been shown to be a little over 3 per cent from the use of local anesthesia, and about 6 per cent or a fraction under with the use of ether. That in itself is significant.

Another significant fact is that we had only two deaths from coma, one of which was after the use of local anesthesia, and one after the use of ether.

Dr. Zimmerman remarked about vomiting following the use of ether. I wish to repeat what I said that ether cannot be considered as an entity in speaking of anesthesia. The factors which enter into ether anesthesia lie beyond the ether itself; and they lie with the operator, in his technic, and in the manner in which the ether is given. At the Clinic ether is administered lightly. In diabetic patients special precautions have been taken, and we have had very little trouble with vomiting.

In cases in which fluids can not be given by mouth we have given fluid subcutaneously, intravenously, or by bowel. It has not been possible for us but it may be in the future, to make a comprehensive study of the exact chemical changes in the body in these patients during and immediately after operation. It is self evident that such a study is difficult to make except experimentally.

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R. E. FARR, M. D.

Minneapolis

L. B. WILSON, M. D.

Rochester

H. LONGSTREET TAYLOR, M. D.

St. Paul

F. L. ADAIR, M. D.

Minneapolis

J. T. CHRISTISON, M. D., St. Paul

EDITORIAL OFFICE

CARL B. DRAKE, M. D., EDITOR

1300 Lowry Bldg., St. Paul

BUSINESS MANAGER

J. R. BRUCE, 403 Central Bank Bldg., Saint Paul

Telephone: N. W. Cedar 1683

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Vol. IV

January, 1921

No. 1

EDITORIAL

LIQUOR AND THE DOCTOR

The medical profession has received a black eye because of its attitude towards the prescribing of liquor. For the most part promiscuous prescribing has been done by those with elastic consciences or none at all, for the fee attached (and often a handsome one at that) so that the practice of medicine in some cases has come to resemble high class bar tending. That a considerable element in the profession has been willing to cheapen their calling by abusing their privilege is perhaps not to be wondered at but the practice cannot be too heartily condemned.

The Volstead Law, adopted by our representatives in Washington, the representatives we voted for and who acted according to their best judgment (a judgment, by the way, which will be upheld if the question is ever submitted to popular vote) had for its object the elimination of alcoholic beverages. The medical value of alcohol taken internally being an open question, provision was made whereby the occasional patient who might, in the physician's opinion, be benefited, could be accommodated.

It is true that there is a strong public sentiment opposed to prohibition. It is also true that the average citizen has no qualms about breaking the law to the extent of taking a drink when opportunity arises. Rather strong pressure is

exerted at times when your friend wants a nip and you are in a position to furnish it. One way to avoid the situation is not to take out a license and this procedure is strongly recommended to those who have not the back bone to say no or wish to avoid unpopularity.

At first thought it would seem as though the present state of affairs would gradually adjust itself. As the stubs of the first prescription book are turned in, previous to the issuing of a second book, one would think that it would be easy to detect the law breaker. A crook is generally a good liar, however, and should be able to fake names and diseases with facility.

Most of us can practice medicine without prescribing spiritus frumenti and the like; for the same results can be obtained from alcoholic preparations which do not tickle the palate to the extent of over indulgence. It would be no tragedy if the privilege of prescribing alcohol in drinkable form were taken from the profession and we do not hesitate to predict that this will occur if the present disgraceful state of affairs persists.

THE NEW EXECUTIVE SECRETARY

Every State Medical Association in the union has been at some time or other confronted with the problems of how to best handle their secretarial work. It is often difficult to find the M. D. who has the time, inclination and qualifications to handle the detailed work of such an organization as it should be handled. It is the consensus of opinion that the work requires a knowledge of business principles in which the average physician has had no training.

The various state organizations have handled the situation as best they could. The smaller states, being woefully lacking in membership and consequently funds, single out one of their number as more or less the goat and allow him to carry on the secretarial activities in any slipshod manner he pleases and even allow him to pay some of the necessary expenses out of his own pocket. The larger states, for instance Ohio and Virginia, having large memberships, hire a business man as full time executive secretary and allow him to accomplish results in a business like manner. While such a method seems dangerous to the more conservative mem-

bers of the profession, this scheme has worked well in the states mentioned.

Minnesota, with a membership of about fifteen hundred, is unable financially to adopt such a program, which, to some at least, seems ideal. If the profession of the state had a little more esprit de corps, appreciated the benefits of concerted action and if all desirables were numbered in the membership of the state association we would be able to employ a full time executive secretary and greatly increase the influence of the profession in the state. Unionism has proved its value and while of late has come into general disrepute because of abuse of its power, no one would be so bold as to predict any immediate danger of a strike on the part of the present organization of the medical profession. There are very definite indications, however, that there will be, in the not distant future a very serious need for organized action by the profession in state and nation if the present standing of the profession is to avoid a marked set back such as has occurred, notably, in England. It behooves every physician therefore to join his local society, adding his influence to the sum total.

Our state organization has induced Mr. J. R. Bruce, who has done so much for the Journal as business manager, to assume the additional duties of executive secretary. The work of the secretary and editor, which offices were combined at the last state medical meeting, will be materially lessened with the assumption by Mr. Bruce of the details of the business of the association in connection with the business side of the Journal at his office, 403 Central Bank Building, St. Paul.

MINNESOTA MEDICINE ADVERTISERS

The whole field of advertising has evolved from the mere offering of things for sale, to a definitely higher level. While the advertiser utilizes the power of suggestion, repetition and surprise he goes still further. Advertising has become an art in itself. The advertising columns of many a magazine are more carefully edited, are more beautifully illustrated and are more interesting than the reading matter itself.

Advertisements are the pulse of the business world. Doctor, take the pulse of the medical

business world and go through the advertising pages of this journal. They will interest you. Our advertisements conform and have always conformed to the standards of ethical medical advertising established by the American Medical Association. This progressive step was one of the reasons for the establishment of Minnesota Medicine. If you see a thing advertised in this journal you can count on its reliability.

Our advertisers make the journal possible and should be patronized whenever possible. If a party advertises in our journal it is only turn about fair play to patronize him. If every subscriber when about to buy anything medical will first consult the journal advertisements and let it be known that he patronizes Minnesota Medicine advertisers, this department will increase and so will the size and importance of the journal.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

ALL-AMERICAN CONFERENCE ON VENEREAL DISEASE

A conference was held in Washington, D. C., December 6th to 11th, 1920, under the auspices of the United States Interdepartmental Social Hygiene Board, the United States Public Health Service, the American Red Cross and the American Social Hygiene Association. This conference will add impetus to the fight against the Great Red Plague being waged by these organizations. Dr. William H. Welch of Baltimore is president and Dr. Allen Winter of Washington the executive secretary.

THE MINNESOTA STATE REGISTERED NURSES' ASSOCIATION

The Minnesota State Registered Nurses' Association, held its annual meeting at the Wilder Building in St. Paul, October 21 and 22, 1920. There were delegates from all Districts and the total attendance was more than three hundred.

It was decided last year to divide the State into five Districts and the activities of the Association during the past year have been centered chiefly on the completion of these District Organizations. This has been accomplished. The Second District has as its center Duluth; Third District, Minneapolis; Fourth District, St. Paul; Fifth District, Mankato, and Sixth District, Rochester. The Third and Fourth Districts are conducting central registries.

The morning of the first day was given to the Council meeting and the afternoon to Section round tables. At the League Section, a paper by Miss

Rankeillour of the Nurse Examining Board, who had inspected a number of Training Schools throughout the State, proved the need of a regular inspector. At the Public Health Section, there were interesting discussions on the different branches of Public Health Nursing.

At the evening meeting which was held at the Young Women's Christian Association, Miss Williams, of the League of Women Voters, gave an instructive talk on the State issues and balloting. This was followed by an informal reception.

At the business meeting on the 22nd, a report from the State Examining Board showed that 478 nurses had been granted registration during the year. There was considerable discussion on the subject of legislation. It was decided to defer legislation until 1922, and begin work on a new bill at once. The Association pledged \$15.00 towards a full time Secretary for the State Association and the State Board of Examiners.

The report of elections was as follows:

President—Miss Irene English, N. P. Hospital, Brainerd.

First Vice President—Miss Louise Pewell, University Hospital, Minneapolis.

Second Vice President—Miss Florence Whipple, Mankato.

Third Vice President—Miss Louise Schneller, Duluth, Public Health.

Secretary—Miss Sophia Olson, City and County Hospital, St. Paul.

Treasurer—Miss Irene Johnson, Swedish Hospital, Minneapolis.

Director—Miss Frances Brink, Minneapolis, Public Health.

Director—Miss Minnie Paterson, Wells Memorial Hospital, Minneapolis.

Miss Schneller, of Duluth, President of Second District, extended to the State Association, an invitation to hold its next annual meeting in Duluth.

NORTHERN MINNESOTA MEDICAL SOCIETY

The Northern Minnesota Medical Association was formed at a joint meeting of the Park Region, Clay-Becker and Red River Valley societies at Fergus Falls, September 29th. Realizing the need for a regional society to care for the profession in the north-western part of the state this society was launched and will hold its first meeting in the spring at Detroit. The following officers were elected: Dr. Theodore Bratrud, Warren, president; Dr. Victor E. Verne, Moorehead, vice president, and Dr. Willard L. Burnap, Fergus Falls, secretary-treasurer.

ST. PAUL CLINIC WEEK

The scientific program will be given Tuesday afternoon and Wednesday evening. Dr. W. J. Mayo of Rochester, Dr. B. W. Sippy and Dr. Joseph Beck of Chicago will give the Tuesday afternoon program. Dr. George W. Crile of Cleveland and Dr. B. H. Orn-

doff of Chicago will give the Wednesday evening program. Titles of papers to be announced later.

The Minnesota Academy of Ophthalmology and Oto-Laryngology will have a dinner on Tuesday evening. Dr. Joseph Beck of Chicago will be the guest of honor.

MEDICAL OFFICERS, watch bulletin boards for special information. "GET TOGETHER" and "ARMY MESS", Tuesday evening, 6:30 at Fort Snelling. Lt. Colonel Rutherford has invited Surgeon General Ireland to attend.

On Thursday evening there will be a reception by Governor Preus and state officials at the State Capitol, followed by an informal dancing party and other social festivities at the St. Paul Hotel.

Entertainment for the ladies is being arranged.

It is suggested that on account of the large attendance expected it would be advisable to make hotel reservations without delay through the executive committee, 1300 Lowry Bldg., St. Paul, Minn.

A schedule of clinics and demonstrations for the following day will be posted on bulletin boards at headquarters not later than 5 p. m. on the day previous. Daily printed bulletins issued every morning will also give a list of clinics for the day.

Headquarters at the St. Paul Hotel.

PROGRAM FOR CLINIC WEEK, ST. PAUL, JAN. URAY 10th-15th, 1921

Schedule of Clinics, Monday January 10th, 1921
9 to 12 A. M.

Bethesda Hospital

Dr. O. W. Holcomb, Room 1—Surgical Clinic.

Dr. H. E. Binger, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. C. O. Olson, Room 2—Second Period Surgical Clinic.

Drs. Gillette & Chatterton, Room 3—Orthopedic Clinic.

City and County Hospital

Dr. Paul D. Berrisford, Room 3—Eye, Ear, Nose and Throat Clinic.

Dr. A. E. Comstock, Room 2—Surgical Clinic.

Dr. A. R. Colvin, Room 1—Surgical Clinic.

Dr. L. E. Daugherty, Room 5—Surgical Clinic.

Dr. C. D. Freeman, Room 4—Urological Clinic.

Dr. T. L. Birnberg—Pediatric Clinic.

Drs. Taylor and Geer, T. B. Annex—Tuberculosis Clinic.

Dr. Carl B. Drake, Ward—Medical Clinic.

Dr. W. S. Fullerton, X-ray Laboratory—X-ray Demonstrations.

Miller Hospital

Dr. Harry Zimmerman, Room 1—Surgical Clinic.

Dr. J. F. Hammond, Room 2—Gynecological Clinic.

Dr. C. Eugene Riggs—Neurological Clinic.

Dr. J. S. Gillilan—Medical Clinic.

Dr. O. B. Chandler, X-ray Room—Fluoroscopic Demonstration.

Dr. M. Warwick, Path. Laboratory—Pathological Demonstration.

Mounds Park Sanitarium

Drs. Robert and George Earland Associates—Surgical Clinic, Radium and X-ray Treatments; Oral Infections and Surgical After-treatments.

Dr. G. Kvitrud and Associates—Demonstration of Routine Wassermann and General Laboratory Technic.

St. Johns Hospital

Drs. Paul and John Kelly, Room 2—Surgical Clinic.
Dr. F. B. Morrissey and Dr. A. Kaplan, Room 1—Medical Clinic.

St. Josephs Hospital

Drs. O'Brien and Teisberg, Room 1—Surgical Clinic.
Dr. Arnold Schwyzer, Room 2—Surgical Clinic.
Dr. W. C. Carroll and Staff, Room 3—Surgical Clinic.

Dr. A. W. Hilger, Room 4—Nose and Throat Clinic.
Dr. Thomas McDavitt, Room 5—Eye and Ear Clinic.
Dr. Arthur Sweeney, Nurses Lecture Room—Neurological Clinic.

St. Lukes Hospital

Dr. C. L. Larsen, Room 1—Eye, Ear, Nose and Throat Clinic.
Dr. Chas. N. Hensel—Medical Clinic.

St. Pauls Hospital

Dr. E. M. Jones, Main Operating Room—Surgical Clinic.
Dr. H. N. Klein—Genito-Urinary Clinic.

State Hospital for Crippled Children

Dr. Warren Dennis, Room 1—Surgical Clinic.

University Hospital

Dr. Harry Ritchie—Surgical Clinic.

MONDAY, 2 to 5 P. M.

Bethesda Hospital

Dr. E. G. Sterner, Room 1—X-ray Demonstration.

City and County Hospital

Dr. Harry Zimmerman, Room 1—Surgical Clinic.
Dr. John L. Shellman, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. L. W. Barry, Delivery Room—Obstetric Clinic.
Dr. E. M. Hammes, Room 3—Nervous and Mental Clinic.

Dr. O. A. Groebner, O. North Ward—Contagious Clinic.

Dr. G. B. Kramer, Morgue and Laboratory—Autopsies and Pathologic Demonstration.

Miller Hospital

Dr. F. E. Burch, Room 1—Eye Clinic.
Dr. E. T. F. Richards, Room 2—Medical Clinic.
Dr. O. B. Chandler, X-ray Room—Plate and Radiographic Demonstration

Dr. M. Warwick, Laboratory—Frozen Section Demonstration.

Mounds Park Sanitarium

Dr. Chas. Ball—Neurological Clinic.

Drs. Robt. Burns and A. Leitch—Medical Clinic.
Dr. G. Kvitrud and Assistant—Blood Chemistry and Basal Metabolism.

St. Johns Hospital

Drs. Albert and Adolph Ahrens, Room 2—Surgical Clinic.

Dr. H. N. Klein, Room 1—Skin Clinic.

Dr. E. L. Kannary, Room 3—Genito-Urinary Clinic.

St. Josephs Hospital

Dr. H. G. Wood—Medical Clinic.

Dr. Chas. N. Hensel—Medical Clinic.

Dr. B. H. Ogden—Medical Clinic.

St. Lukes Hospital

Dr. E. L. Warren, Room 1—Nose and Throat Clinic.
Dr. John Armstrong, Room 2—Dermatological Clinic.

Dr. Edward Schons, X-ray Room—X-ray Technic

State Hospital for Crippled Children

Dr. Robt. Earl, Room 1—Surgical Clinic.
Miss Jensen—Mechanical and Gymnastic Clinic for correction of deformities.

Free Dispensary, 1 to 3 P. M.

Dr. W. S. Howard, Room 1—Medical Clinic.

Wilder Charity, 1 to 3 P. M.

Dr. Jennette McLaren, Room 1—Diseases of Infancy.

Dr. J. D. Geissinger, Room 2—Infant Feeding.

Dr. G. K. Hagaman, Room 3—Infant Feeding.

TUESDAY, 9 to 12 A. M.

Bethesda Hospital

Dr. V. N. Peterson, Room 1—Surgical Clinic.

Dr. O. I. Solberg, Room 2—Surgical Clinic.

Dr. E. G. Sterner, Room 2, Second Period—Surgical Clinic.

Dr. K. C. Wold, Room 1, Second Period—Eye, Ear, Nose and Throat Clinic.

City and County Hospital

Dr. J. C. Brown, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. M. M. Ghent, Room 2—Gynecological Clinic.

Dr. J. F. Hammond, Room 3—Gynecological Clinic.

Dr. E. V. Goltz—Medical Clinic.

Dr. A. R. Hall—Medical Clinic.

Dr. G. K. Hagaman—Pediatric Clinic.

Dr. W. S. Fullerton, X-ray Room—X-ray Demonstrations.

Miller Hospital

Dr. J. L. Rothrock, Room 1—Gynecological Clinic.
Drs. MacLaren, Ritchie and Daugherty, Room 2—Surgical Clinic.

Dr. J. S. Gilfillan—Medical Clinic.

Dr. O. B. Chandler and Assistants, X-ray Room—Fluoroscopic Demonstrations.

Dr. Margaret Warwick, Pathological Laboratory—Routine Laboratory Work.

Mounds Park Sanitarium

Dr. C. Eugene Riggs—Nervous and Mental Clinic.

St. Johns Hospital

Drs. F. J. Plondke and Staff, Room 2—Surgical Clinic.

Dr. T. L. Birnberg, Room 1—Pediatric Clinic.

St. Josephs Hospital

Drs. Carroll, Wood and Dunn, Room 1—Surgical Clinic.

Drs. Schuldt and Neher, Room 3—Surgical Clinic.

Dr. Arnold Schwyzer, Room 2—Surgical Clinic.

Drs. Comstock, Rutherford and Gruenhagen, Room 4—Surgical Clinic.

Dr. J. S. White, Room 5—Nose and Throat Clinic.

St. Lukes Hospital

Drs. Lerche and Kittleson, Room 1—Stomach Clinic.

St. Pauls Hospital

Dr. Egil Boeckmann—Eye, Ear, Nose and Throat Clinic.

State Hospital for Crippled Children

Dr. C. C. Chatterton—Orthopedic Clinic.

Dr. Walter Ramsey—Pediatric Clinic.

WEDNESDAY, 9 to 12 A. M.

Bethesda Hospital

Dr. C. L. Larsen, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. J. T. Holcomb, Room 2—Surgical Clinic.

Dr. V. N. Peterson Room 2, Second Period—Surgical Clinic.

City and County Hospital

Dr. W. W. Lewis, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. Paul Kelly, Room 2—Surgical Clinic.

Dr. H. M. Lufkin Room 3—Gynecological Clinic.

Dr. W. C. Rutherford, Room 4—Surgical Clinic.

Dr. E. T. Herrmann—Medical Clinic.

Dr. Peder Hoff—Medical Clinic.

Drs. Taylor and Geer—Tuberculosis Clinic.

Dr. H. Klein—Genito-Urinary Clinic.

Dr. T. L. Birnberg—Pediatric Clinic.

Dr. J. F. Fulton—Eye, Ear, Nose and Throat Clinic.

Dr. W. H. Hengstler—Neurological Clinic.

Dr. W. S. Fullerton—X-ray Demonstration.

Miller Hospital

Dr. Warren A. Dennis, Room 1—Surgical Clinic.

Dr. Harry J. O'Brien, Room 2—Surgical Clinic.

Dr. John T. Rogers, Room 3—Surgical Clinic.

Dr. E. M. Hammes—Neurological Clinic.

Dr. O. B. Chandler, X-ray Laboratory—X-ray Therapy.

Dr. M. Warwick and Assistants, Laboratory—Basal Metabolism.

Mounds Park Sanitarium

Drs. Robert and George Earl and Associates—Sur-

gical Clinic, Radium and X-ray Treatments, Oral Infections and Surgical After-Treatments.

St. Johns Hospital

Drs. H. Nippert and Bock Room 1—Medical Clinic.

Dr. Leo Hilger, Room 2—Surgical Clinic.

St. Josephs Hospital

Dr. J. L. Rothrock, Room 1—Gynecological Clinic.

Dr. E. M. Jones, Room 2, Second Period—Gynecological Clinic.

Dr. W. C. Carroll and Staff, Room 3—Surgical Clinic.

Dr. Arnold Schwyzer, Room 2—Surgical Clinic.

Dr. Chas. McNevin, Room 4—Surgical Clinic.

Dr. H. J. Rothschild, Room 5—Eye and Ear Clinic.

Dr. Haldor Sneve, Nurses Lecture Room—Nervous and Mental Clinic.

St. Lukes Hospital

Dr. A. R. Colvin and Associates Room 1—Surgical Clinic.

Drs. Paul Cook and Chas. Freeman, Room 2—Urological Clinic.

St. Paul Hospital

Dr. C. B. Teisberg—Surgical Clinic.

State Hospital for Crippled Children

Dr. Wallace Cole—Operative Orthopedic Clinic.

WEDNESDAY, 2 to 5 P. M.

City and County Hospital

Dr. Albert Ahrens, Room 1—Surgical Clinic.

Dr. J. L. Shellman, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. M. H. Knauff, Room 4—Orthopedic Clinic.

Dr. A. G. Schulze, Delivery Room—Obstetric Clinic.

Dr. C. A. Olson, North Ward—Contagious Clinic.

Dr. E. M. Hammes—Nervous and Mental Clinic.

Dr. G. B. Kramer, Morgue—Autopsies.

Miller Hospital

Dr. F. E. Burch, Room 1—Eye Clinic.

Dr. Arthur Sweeney—Nervous and Mental Clinic.

Dr. O. B. Chandler, X-ray Room—Plate and Radiographic Demonstrations.

Dr. Warwick and Assistants, Laboratory—Laboratory demonstrations, Frozen Sections, etc.

Mounds Park Sanitarium

Dr. E. J. Engberg—Nervous and Mental Clinic.

Drs. Robt. Burns and A. Leitch—Medical Clinic.

Dr. G. Kvitrud and Assistants—Blood Chemistry and Basal Metabolism Demonstration.

St. Johns Hospital

Dr. Sam Ziegler, Room 2—Oral Clinic and Surgery of the Jaw.

Dr. A. Kaplan, Room 1—General Laboratory and X-ray Demonstrations.

St. Josephs Hospital

Drs. A. E. Comstock, Rutherford and Gruenhagen, Room 1—Surgical Clinic.

Dr. R. G. Allison, Room 1—X-ray Demonstration of Gastric and Duodenal Ulcer.

St. Lukes Hospital

Dr. Chas. Lyman Greene.
Dr. J. W. Chamberlin and Louis A. Nelson, Room 1—Eye Clinic.
Dr. Edward Schons, Laboratory—X-ray Technic.

St. Paul Hospital

Dr. A. C. Potter—Teeth Extraction. Why it has failed. A rational procedure for handling infected cases.

State Hospital for Crippled Children

Dr. Chas. Ball—Neurological Clinic.

Free Dispensary

Dr. E. M. Hammes, 1 to 3 P. M.—Nervous and Mental Clinic.

Wilder Charity Building

Dr. Jeanette McLaren, Room 1—Infant Diseases.
Dr. J. D. Geissinger, Room 2—Infant Feeding.
Dr. G. K. Hagaman, Room 3—Infant Feeding.

Fort Snelling Hospital

Col. H. H. Rutherford, M. C., U. S. A.—Routine Treatment of Genito-Urinary Conditions in the Army.

University Hospital

Dr. E. T. F. Richards—Medical Clinic.
Dr. L. W. Barry,—Obstetric Clinic.

THURSDAY, 9 to 12 A. M.

Bethesda Hospital

Dr. K. C. Wold, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. E. W. Ostergren, Room 2, Second Period—Surgical Clinic.

Dr. O. W. Holcomb, Room 3—Surgical Clinic.

City and County Hospital

Dr. H. E. Molzahn, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. John Abbott, Room 2—Surgical Clinic.

Dr. E. M. Jones, Room 3—Gynecological Clinic.

Dr. C. B. Teisberg, Room 1, Second Period—Surgical Period.

Dr. J. D. Geissinger—Pediatric Clinic.

Dr. W. H. Hengstler—Nervous and Mental Clinic.

Dr. J. A. Lepak—Medical Clinic.

Dr. A. E. Mark—Medical Clinic.

Dr. L. W. Barry—Obstetric Clinic.

Dr. W. S. Fullerton—X-ray Demonstration.

Miller Hospital

Drs. Rogers and Zimmerman, Room 1—Surgical Clinic.

Dr. A. R. Hall—Medical Clinic.

Drs. Cook and Freeman—Urological Clinic.

Dr. F. E. Burch, Room 3—Eye Clinic.

Dr. Arthur Sweeney—Nervous and Mental Clinic.

Dr. O. B. Chandler—Plate and Radiographic Demonstrations.

Dr. M. Warwick and Assistants, Laboratory—Laboratory Demonstrations, Frozen Sections, etc.

Mounds Park Sanitarium

Dr. Chas. Ball—Neurology and Psychiatry.

Dr. L. G. Dack—Nose and Throat Clinic.

Dr. E. Ostergren—Surgical Clinic.

Dr. A. E. Cornlea, X-ray Room—X-ray Clinic.

Dr. G. Kvitrud and Assistants—Routine Wassermann and General Laboratory Technic.

Dr. C. E. Riggs—Nervous and Mental Clinic.

St. Johns Hospital

Drs. Gillette, Chatterton and Von Der Weyer, Room 2—Orthopedic Clinic.

Dr. H. J. Rothschild, Room 1—Common Diseases of the Eye.

St. Josephs Hospital

Drs. Schwyzer, Geist and Norris, Room 1—Surgical Clinic.

Dr. Comstock and Staff, Room 3—Surgical Clinic.

Dr. G. A. Geist, Room 2—Gynecological Clinic.

Dr. John Armstrong, Room 4—Skin Clinic.

Dr. H. E. Hunt, Room 5—Nose and Throat Clinic.

Dr. Wm. Davis, Nurses Lecture Room—Medical Clinic.

St. Lukes Hospital

Drs. MacLaren, Ritchie and Daugherty, Room 1—Surgical Clinic, Pathological and X-ray demonstration.

St. Pauls Hospital

Dr. F. J. Mitchell—Eye, Ear, Nose and Throat Clinic.

State Hospital for Crippled Children

Dr. H. E. Binger—Tonsil Clinic.

Dr. E. M. Hammes—Neurological Clinic.

THURSDAY, 2 to 5 P. M.

Bethesda Hospital

Dr. Chas. Ball, Chapel—Neurological Clinic.

City and County Hospital

Dr. Wm. Lerche, Room 1—Surgery of the Esophagus.

Dr. G. B. Kramer, Morgue—Autopsies.

Miller Hospital

Dr. C. E. Connor, Room 1—Otolological Clinic.

Dr. J. T. Christison, Room 2—Pediatric Clinic.

Dr. E. T. F. Richards—Medical Clinic.

Dr. E. R. Bray—Ear, Nose and Throat

Dr. O. B. Chandler, X-ray Room—X-ray Demonstrations.

Dr. M. Warwick and Assistants, Laboratory—Frozen Sections.

Mounds Park Sanitarium

Dr. E. M. Hammes—Nervous and Mental Clinic.

Dr. R. Burns and A. Leitch—Medical Clinic.

Dr. G. Kvitrud and Assistants—Pathological Specimens and Basal Metabolism Demonstration.

St. Johns Hospital

Dr. F. J. Plondke and Staff, Room 2—Surgical Clinic.

Dr. Arthur Sweeney, Room 1—Neurological Clinic

St. Josephs Hospital

Dr. C. W. Fogarty, Room 1—Eye, Ear, Nose and Throat Clinic.

Dr. F. C. Schuldt—X-ray Demonstration.

Dr. H. N. Klein—Genito-Urinary and Skin Clinic.

St. Lukes Hospital

Dr. Chas. Lyman Greene and Associates—Heart and Chest Clinic.

St. Paul Hospital

L. N. Garlough, B. A.—Life History and Anatomy of Parasitic Worms of the Northwest, Infecting Man, A Relation to Prophylaxis with Demonstrations.

Free Dispensary

Dr. L. W. Barry, Room 1—Gynecological Clinic.

Dr. T. L. Birnberg, Room 2—Pediatrics.

Drs. Fulton and Rothschild—Eye Clinic.

Dr. H. J. Molzahn—Ear, Nose and Throat Clinic.

For Snelling Hospital

Col. H. H. Rutherford, M. C. U. S. A.—Routine Treatment of Genito-Urinary Conditions in the Army.

University Hospital

Dr. Walter Ramsey—Pediatric Clinic.

FRIDAY, 9 to 12 A. M.

Bethesda Hospital

Dr. E. G. Sterner, Room 1—Surgical Clinic.

Dr. H. E. Binger, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. J. T. Holcomb, Room 3—Surgical Clinic.

City and County Hospital

Dr. H. J. Rothschild—Eye, Ear, Nose and Throat Clinic.

Dr. A. E. Comstock, Room 1—Surgical Clinic.

Dr. L. E. Daugherty, Room 2—Surgical Clinic.

Dr. M. M. Ghent, Room 3—Gynecological Clinic.

Dr. E. C. Gager—Genito-Urinary Clinic.

Dr. Walter Ramsey—Pediatric Clinic.

Dr. H. Oerting—Medical Clinic.

Dr. E. T. F. Richards—Medical Clinic.

Drs. Taylor and Geer—Tuberculosis Clinic.

Dr. W. S. Fullerton—X-ray Demonstration.

Miller Hospital

Dr. J. L. Rothrock, Room 1—Surgical Clinic.

Dr. Wallace Cole, Room 2—Orthopedic Clinic.

Drs. Cook and Freeman—Urological Clinic.

Dr. Geo. Senkler—Medical Clinic.

Dr. E. M. Hammes—Neurological Clinic.

Dr. Margaret Warwick—Blood Chemistry, etc.

Mounds Park Sanitarium

Drs. Robert and George Earl and Associates—Surgical Clinic, Radium and X-ray Treatments. Oral Infections, and Surgical After-Treatments.

Dr. G. Kvitrud and Assistants—Routine Wassermann and General Laboratory Technic.

St. Johns Hospital

Dr. H. E. Molzahn, Room 2—Tonsil Clinic.

Dr. T. J. Maloney—Eye, Ear, Nose and Throat Clinic.

Dr. H. N. Klein, Room 3—Cystoscopy.

St. Josephs Hospital

Drs. Jones and Hullsiek, Room 1—Surgical Clinic.
Drs. McNevin and Shapere, Room 2—Surgical Clinic.

Drs. W. C. Carroll and Staff, Room 3—Surgical Clinic.

Dr. Geo. Dittman, Room 4—Eye, Ear, Nose and Throat Clinic.

St. Lukes Hospital

Drs. Gillette and Chatterton, Room 1—Orthopedic Clinic.

Dr. John Staley, Room 2—Surgical Clinic.

St. Paul Hospital

Dr. A. E. Ahrens, Room 1—Surgical Clinic.

State Hospital for Crippled Children

Dr. E. R. Bray—Mastoid and other Operations on the Ear.

FRIDAY, 2 to 5 P. M.

City and County Hospital

Dr. J. F. Hammond, Room 1—Gynecological Clinic.

Dr. Paul Berrisford, Room 2—Eye, Ear, Nose and Throat Clinic.

Dr. A. G. Schulze, Delivery Room—Obstetric Clinic.

Dr. E. F. Warner, O. North Ward—Contagious Clinic.

Dr. G. B. Kramer, Morgue—Autopsies.

Miller Hospital

Dr. F. E. Burch, Room 1—Eye Clinic.

Dr. E. T. Herrmann, Room 2—Medical Clinic.

Dr. Chandler—X-ray Demonstrations.

Dr. Margaret Warwick—Laboratory Demonstrations.

Mounds Park Sanitarium

Dr. W. H. Hengstler—Nervous and Mental Clinic.

Dr. A. Leitch—Heart Clinic with Electro-Cardiography.

Dr. G. Kvitrud and Assistants—Blood Chemistry and Basal Metabolism Demonstration.

St. Josephs Hospital

Dr. E. Norris and J. Wimbigler, Room 1—Pathology and Laboratory Demonstration.

St. Lukes Hospital

Dr. H. Oerting, Room 1—Transfusion and Intravenous Medication Methods.

Dr. Edward Schons, Laboratory—X-ray Technic.

State Hospital for Crippled Children

Drs. Binger and Wheeler—Tonsil Clinic.

Dr. E. T. F. Richards—Medical Clinic.

Free Dispensary, 1 to 3 P. M.

Dr. O. Sohlberg, Room 1—Medical Clinic.

Dr. H. N. Klein—Skin Clinic.

Dr. E. J. Engberg—Nervous and Mental Clinic.

Wilder Charity, 1 to 3 P. M.

(Baby Welfare)

Dr. Jeanette MacLaren—Infant Feeding.

Dr. J. D. Geissinger—Diseases of Infancy.

Dr. G. K. Hagaman—Infant Feeding.

Fort Snelling Hospital

Col. H. H. Rutherford, M. C., U. S. A.—Routine Treatment of Genito-Urinary Conditions in the Army.

OBITUARY



ALFRED EUGENE SPALDING

Spalding has left us. After struggling desperately for eight days with lobar pneumonia he succumbed to the overwhelming forces of that "natural end of man", while we who remain are bewildered by the suddenness of it all and are vainly trying to accustom ourselves to the situation.

He had lived a busy, active life. He was born in Sault Sainte Marie, Michigan, on November 24, 1851. Beginning the study of his profession in 1870, he was graduated from Jefferson Medical College in the spring of 1874, at the age of 22. He began practice in Winnebago, Illinois, the same fall, moving to Geneseo, Illinois, two years later. In the summer of 1878 he removed to Luverne, Minnesota, and there practiced for the forty-two years succeeding, working steadily until the week before his death, which occurred on Saturday, December 4, 1920. How well he spent this period is known to many, far beyond the confines of his immediate neighborhood.

Outside of his home he was primarily interested in his profession and in the activities connected with it. Early in his career he began to manifest a leaning toward surgery, and as the years went on he developed increasingly in that direction, becoming con-

stantly more widely known and more efficient. Like his tastes, his tendency in surgery was toward a simple, conservative technique, and his results were correspondingly good. He was a great believer in the usefulness of the medical society, both from the viewpoint of the broadening influence of personal contact with one's fellow practitioners, and the opportunity for interchange of ideas. Especially will the Southwestern Minnesota Medical Society and the Sioux Valley Medical Association miss him sorely from their counsels, for in both of these, made up as they were of his professional neighbors, he took deep interest, and seldom missed attending a meeting. His own contributions to the programs were models of terseness and replete with original ideas. He was never guilty of inflicting long academic theses on his audiences, but generally chose to present the resume of a clinical case, often with a specimen. Never being prolix, his efforts were always welcomed and listened to with attention. At the banquets he invariably could be counted upon for a good story, an original poem or a song, and into these occasions he entered with great zest, for these were his moments of relaxation when the seamy side of his profession could be, for the nonce, laid aside. He liked music, baseball and his medical society affiliations, and who shall say that he did not live longer and keep younger for cultivating these tastes?

He married Miss Lucy A. Thomas of Geneseo, Illinois, on December 24, 1874. Mrs. Spalding died in January, 1908. In February, 1909, Dr. Spalding married Miss Alma Orth of Lidgerwood, North Dakota, who survives him, as do also two daughters, Mrs. Ira Curtis of Mason City, Iowa, and Mrs. Gerald Connell of Thief River Falls, North Dakota.

The services at his burial were characteristic of his life. Professional friends gathered from far and near, just as though to a medical meeting, and mingled with the throng of neighbors and friends who had assembled in the Presbyterian church within a stone's throw of his home in Luverne. There was little outward manifestation of grief, for the "sadness of farewell" was overshadowed by the feeling of profound thankfulness for a noble life well spent, in the heart of everyone present.

Before the conclusion of the service Dr. McDavitt of St. Paul, old comrade and fellow-worker in the State Medical Society for years, stood beside the still form and told in brief words of his friend's life and influence, the crowning effort of a beautiful occasion and a masterpiece of spontaneous rhetoric. It was a fitting valedictory for one who stood as Spalding did in his community and in his profession, whose attainments and achievements had woven his life into the very fabric of the place in which he had striven so long and as we left him in his last resting place overlooking the scene of his labors, the irresistible thought came to me that no chance circumstances

like the termination of bodily activities could stop the impetus of spiritual momentum resulting from the life-long work of such a man. If this be true, then the life of our dear friend and colleague shall have been doubly fruitful, and his influence will have survived long after the dissolution of his earthly body.

G. G. COTTAM.

CORRESPONDENCE

Some Indian Medicinal Receipts

Kayenta, Ariz.

Oct. 8, 1920.

Minnesota Medicine,

St. Paul, Minn.

While doing research work among the Bois Fort Indians of Minnesota while I was Indian Agent at Nett Lake in that state one of the medicine men allowed me to copy his medicinal receipts. Believing that, while they are not very scientific they will be of interest to the medical profession, I give them below:

1. "Receipts for medicine for pain in the stomach, also for fainting and trembling in fits. Also if very sick or a bad sore apply this medicine externally. Also for cuts, say of an ax, put this preparation on.

"Make a tea of all the different roots and barks mentioned below by boiling or steeping same: swamp spruce, the pussy willow, norway pine, white pine, kinnikinnik, and oak. To this add a little sugar to sweeten it.

2. "The following medicine is to be given for 'internal blood diseases:'

"Boil the bark of the following trees and shrubs: white poplar, yellow poplar, white birch, yellow birch, large oak, small oak, small kinnikinnik, large kinnikinnik, and all of the trees south of you. This drink.

3. "For gonorrhea make a tea of the root-bark of the following trees, ash, oak, white elm, and sugar maple. Then add a little tobacco. Then set the solution just east and quite close to some trees. When cool, drink a cupful three times a day.

4. "For a 'bad-sick' stomach or bowels caused by eating too much or for constipation drink medicine tea of horsetails and horsemint boiled together.

5. "For stomach trouble drink a cupful of tea, prepared by boiling native peppermint, a rushpepper plant, Minnesota fern and the roots of the crow berry, and slippery (common red) elm together.

6. "Another remedy for fainting and fits, also used as a blood medicine, is sarsaparilla tea made from the leaves of that plant. This drink." (My informant advised me that this remedy is called "Eastern Medicine!" as it is the medicine of the Wabeno (Eastern) Society of his people.

7. "Another general remedy: Take the roots of the swamp tea plant, kinnikinnik, white poplar, and balmagilled poplar and pound them to a pulp. This

stew into a strong tea. This tea apply to the afflicted parts by placing cloths on same and pouring the tea on the cloths so as to thoroughly saturate them. The pounded roots and bark when hot just from the steeping tray are also applied. This remedy is much used for rheumatism and kindred diseases.

8. "For a cut foot apply tea made from boiling together roots of the rose bush, bitterroot, and elm. A little of this tea is also taken inwardly for bleeding."

ALBERT B. REAGAN.

NEW AND NON-OFFICIAL REMEDIES

During October and November the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies.

The Seydel Manufacturing Co.

Betanaphthol Benzoate.

Benzyl Alcohol.

Mercury (Mercuric) Benzoate.

The Abbott Laboratories:

Acriflavine and Proflavine.

L. A. Van Dyk:

Benzyl Benzoate.

Benzyl Benzoate 20 per cent.

Benzyl Benzoate 20 per cent Aromatic.

The Heyden Chemical Co.:

Vargol.

Intra Products Co.:

Benzyl Alcohol.

Ven Sterile Solution Benzyl Alcohol.

Ichthynat.—An aqueous solution, the important medicinal constituents of which are ammonium compounds containing sulphur in the form of sulphonates, sulphones and sulphides. These characteristic forms of sulphur result from the sulphonation of the tarlike distillate obtained from certain bituminous shales. For the actions and uses of ichthynat see the general article on Sulpho-ichthyolate Preparations and Substitutes, New and Non-official Remedies, 1920, page 318. The Heyden Chemical Works, New York City (Jour. A. M. A., Oct. 2, 1920, page 939).

Proganol.—A compound of silver and albumose, containing not less than 8.3 per cent of silver in organic combination. For the actions and uses of proganol, see general article on silver preparations, New and Non-official Remedies, 1920, page 306. From 0.25 to 1 per cent solutions are used in acute gonorrhea, and 5 to 10 per cent instillations in chronic cases. In cystitis and urethritis from 1:1,000 to 1:2,000 solutions are used as irrigations. Used also in forms of bougies and tampons (5 to 10 per cent).

Twenty per cent Aromatized Suspension made from Benzyl Benzoate Van Dyk and Co.—A mixture, each 100 Cc. containing benzyl benzoate for thera-

peutic use (Van Dyk and Co.), 20.32 Gm.; acacia, 8.0 Gm.; olive oil, 5.00 Gm.; sugar, 12.00 Gm.; flavors and water, to make 100 Cc. For actions and uses of benzyl benzoate, see New and Non-official Remedies, 1920, page 49. United Synthetic Chemical Corporation, New York (Jour. A. M. A., Oct. 16, 1920, page 1069).

Acriflavine-Abbott.—A brand of acriflavine (see New and Non-official Remedies, 1920, page 20) complying with the N. N. R. standards. The Abbott Laboratories, Chicago.

Proflavine-Abbott.—A brand of proflavine (see New and Non-official Remedies, 1920, page 21) complying with the N. N. R. standards. The Abbott Laboratories, Chicago.

Betanaphthol Benzoate-Seydel.—A brand of betanaphthyl benzoate (see New and Non-official Remedies, 1920, page 189) complying with the N. N. R. standards. Seydel Manufacturing Co., Jersey City, N. J.

Benzyl Alcohol-Seydel.—A brand of benzyl alcohol (see New and Non-official Remedies, 1920, page 27) complying with the N. N. R. standards. Seydel Manufacturing Co., Jersey City, N. J. (Jour. A. M. A., Oct. 30, 1920, page 1205).

Benzyl Benzoate.—Van Dyk.—A brand of benzyl benzoate (See New and Non-official Remedies, 1920, p. 49) complying with the N. N. R. standards. L. A. Van Dyk, New York, N. Y.

Benzyl Benzoate-Van Dyk 20 per cent.—Each 100 Cc. contains benzyl benzoate-Van Dyk 20 Cc., and alcohol 80 Cc.

Benzyl Benzoate-Van Dyk 20 per cent Aromatic.—Each 100 Cc. contains benzyl benzoate-Van Dyk, 20 Cc.; oil of orange, 0.74 Cc., and alcohol, 79.26 Cc.

Benzyl Alcohol-Ipco.—A brand of benzyl alcohol (See New and Non-official Remedies 1920, 27), complying with the N. N. R. standards. Intra Products Co., Denver, Colo.

Ven Sterile Solution Benzyl Alcohol 4 per cent 2 Cc.—Each ampoule contains benzyl alcohol-Ipco 4 per cent in physiological solution of sodium chloride, Cc. Intra Products Co., Denver, Colo.

Vargol.—A compound of silver and a derived albumin containing not less than 20 per cent of silver. For the action and uses of Vargol, see general article on Silver Preparations under Silver Protein Preparations, Argylol Type, New and Non-official Remedies, 1920, p. 310). Heyden Chemical Co., New York, N. Y. (Jour. A. M. A., Nov. 27, 1920, p. 1499).

PROPAGANDA FOR REFORM

More Misbranded Venereal Nostrums.—The following preparations have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act, on the ground that the therapeutic claims made for them were false and fraudulent: Injection Malydor (The Williams Mfg. Co., Cleveland, Ohio); G Zit (The Stearns Hollinshead Co., Inc., Portland, Oregon); G Zit Aniseptics (The Stearns Hollinshead Co., Portland, Oregon);

Hinkle Capsules (Hinkle Capsule Co., Mayfield, Ky.); Tisit-Pearls (S. Pfeiffer Mfg. Co., East St. Louis, Ill.); Tisit (S. Pfeiffer Mfg. Co., East St. Louis, Ill.); Black-Caps (Safety Remedy Co., Canton, Ohio); Hexagon (Montebello Laboratories, Kansas City); Hyatt's A. B. Balsam C. N. Crittendon Co., New York City); DuQuoin's Compound Santal Pearls (Wm. R. Warner and Co., Inc., New York City); Injection Zip (The Baker-Levy Chemical Co.); Three Days Cure ("3 Days" Cure Co.); Redsules (H. Planten and Son); Blakes Capsules (Henry K. Wampole and Co.); Salubrin (Salubrin Laboratories, Grand Crossing, Chicago); Dolomol-Calomel and Dolomol Iodoform (Pulvola Chemical Co., Jersey City, N. J.); Influenza Special Senoret (Senoret Chemical Co., St. Louis); Gray's Ointment (Dr. W. F. Gray and Co., Nashville, Tenn.); Vegetable Blood Purifier (Gibson-Howell Co., Jersey City, N. J.); Renovine (Van Vleet-Mansfield Drug Co., Memphis, Tenn.); Cin-Ko-Na and Iron (DeLacy Chemical Co., St. Louis); Craig Healing Spring Mineral Water (Craig Healing Springs Hotel, New Castle, Va.); Laxa-Cura Water (Lava-Cura Water Co.); Reuter's Little Pills for the Liver (Barclay and Co., New York); Musser's Capsules (Musser-Reese Chemical Co.); Dr. Sanger's Capsules (Edward J. Moore Sons, Inc.); Rid-It Caps (S. Pfeiffer Mfg. Co.); Black and White Capsules (Wilson Drug Co.); Benetol (Benetol Co.), consisting essentially (in agreement with a previously reported analysis by the A. M. A. Chemical Laboratory) of alphanaphthol, soap, glycerin, water and traces of essential oils and alcohol; G-U-C Capsules (Hollander-Koshland Co.); Merz Santal Compound (Merz Capsule Co.); Enoob Antiseptic Injection and Capsules (Tropical Cooperative Co.) and White Swan Injection (Stacy Chemical Co.); Dr. Clifton's Brazilian Herbs (Clifton Drug Co.); Her-Vo (Her-Vo Mfg. Co.); Acetylo Salicylic Acid Tablets (James and Annis), containing acetanilid but no acetylsalicylic acid; Stearns' Santolids (Frederick Stearns and Co.); Milks' Emulsion (Milks Emulsion Co.); Bliss Native Herbs (Alonzo O. Bliss); Madame Dean Antiseptic Vaginal Suppositories (Martin Rudy) and Halz Tablets (Ed. Price Chemical Co.); D. D. D. Ordinary and D. D. D. Extra Strong (D. D. D. Co.); Compound Extract of Cubebs with Copaiba (The Tarrant Co.); Santal Midy Capsules (E. Fougere and Co.).

The Bethlehem Laboratories Explain.—The president of the General Laboratories, who is also vice president of the Bethlehem Laboratories, explains that the Bethlehem Laboratories is the sales and distribution organization for hyclorite, which is manufactured by the General Laboratories, and that the offer from the Bethlehem Laboratories to sell to physicians shares in the company was the unauthorized act of an authorized agent. The General Laboratories and the Bethlehem Laboratories recognize the impropriety of soliciting physicians to purchase stock in their concern (Jour. A. M. A., Oct. 9, 1920, page 1016).

Succus Cineraria Maritima.—The medical profession is at present receiving through the mail circulars extolling this nostrum for its alleged virtue in "absorbing" various forms of cataract. In February, 1917, the Bureau of Chemistry of the U. S. Department of Agriculture issued a Notice of Judgment which showed that the government authorities had prosecuted the firm which markets the preparation—The Walker Pharmacal Company—because claims were made on the trade package to the effect that this nostrum was a remedy for cataract and other opacities of the eye. The authorities charged that these claims were false and fraudulent. To this charge the company pleaded guilty, but these claims are still being made through other avenues to the medical profession (Jour. A. M. A., Oct. 9, 1920, page 1007).

The Use of Arsphenamine and Related Compounds.—Many therapeutic perplexities remain after nearly a decade of trial of the type of compound which Ehrlich introduced. It is well for the practitioner to realize this, especially when expert workers still make an appeal for conservative interpretation. Arsphenamine has apparently made it possible or even probable, but only to the inexperienced has the cure of syphilis been made absolute and inevitable. Even the composition of arsphenamine and neoarsphenamine is not fully known, and the control of the products by the government is important. It should be borne in mind also that neoarsphenamine behaves differently in the animal organisms from arsphenamine, and should not be regarded simply as arsphenamine in a convenient form for administration. The various brands of arsphenamine and neoarsphenamine made in the United States compare favorably as to toxicity with those made abroad (Jour. A. M. A., Oct. 9, 1920, page 1005).

Bran-O-Lax Tablets.—The public is urged to purchase these "Lavative Wheat-Bran Tablets for constipation and indigestion instead of those severe and harmful drugs". The essential claims, either inferred or expressed, are to the effect that Bran-O-Lax Tablets are wheat bran in condensed form and that they are free from "harmful drugs". It is also claimed that "Bran-O-Lax contains one heaping tablespoonful of plain nutritious wheat bran condensed into tablet form". The A. M. A. Chemical Laboratory reports that Bran-O-Lax Tablets contain wheat bran, reducing sugar (probably glucose) in large amounts, a gummy substance, probably acacia, and about one grain of phenolphthalein per tablet. Whereas a heaping tablespoonful of wheat bran was found to weigh about 166 grains, the total weight of a Bran-O-Lax Tablet was only about 35½ grains (Jour. A. M. A., Oct. 16, 1920, page 1083).

Toxicity of Arsphenamine.—Roth has determined that if an alkalinized solution of arsphenamine or a solution of neoarsphenamine is shaken in the presence of air for one minute, the toxicity is increased. He points out that arsphenamine preparations which

are soluble with difficulty are likely to be shaken to aid in the solution of the drug with the risk that chemical reaction may occur (Jour. A. M. A., Oct. 16, 1920, page 1072).

Chaulmoogra Oil in Leprosy.—Continued trials made at the leprosy investigation station of the U. S. Public Health Service and the Kalihi Hospital at Hawaii seem to justify more than ever the statement that chaulmoogra oil contains one or more agents that exert a marked therapeutic action in many cases of leprosy. The intramuscular injection of the soluble ethyl esters of the fatty acids from chaulmoogra oil usually leads to a rapid improvement in the clinical symptoms of leprosy. The ethyl esters of iodine addition compounds of the unsaturated fatty acids in chaulmoogra oil have also been used. There is no experimental proof that this addition of iodine causes any increase in the effectiveness of the material used (Jour. A. M. A., Oct. 16, 1920, page 1071).

Fake Orange Beverages.—The Orange and other citrus fruits possess value other than that which can be measured by flavor or fuel value. They are relied on as antiscorbutic by a large number of persons in the preparation of food mixtures which for some reason are deficient in this protective element. Oranges merit additional favor because they are relatively rich in the water-soluble vitamin B, sometimes designated antineuritic vitamin, which promotes well-being in as yet an undetermined way. In view of these facts, the chemists of the U. S. Public Health Service have done well in their timely warning against the "fake" orange beverages that have come to their attention. They report that in most cases the fraudulent products consisted of carbonated water, flavored with a little oil from the peel of the orange and artificially colored to imitate orange juice (Jour. A. M. A., Oct. 16, 1920, page 1073).

Vaccines in Toxic Conditions.—Under this title an article purporting to be a scientific contribution appears in the original department of the Illinois Medical Journal. The apparent purpose of the article is to overcome any hesitancy on the part of practitioners to use vaccines in toxic infectious conditions for fear that they might thereby cause harm. The theory propounded is contrary to those who have studied the subject. The man who writes the article, G. H. Sherman, is in the business of making and selling vaccines, though this is not made evident in the article (Jour. A. M. A., Oct. 23, 1920, page 1140).

Vaccines For Common Colds.—There is no scientific evidence that common colds can be prevented by the use of vaccines, despite the glowing recommendations of vaccine makers and the patter of the detail man. Colds characterized by catarrhal inflammation of the mucous membranes of the nose and the throat are caused by various organisms. The organism concerned in one epidemic is different from that in another. It is impossible to anticipate what organism is about to invade the household or community. In-

oculation of mixed vaccines fails to product immunity (Jour. A. M. A., Nov. 13, 1920, p. 1361).

Chlorlyptus Not Accepted For N. N. R.—Chlorlyptus (Weeks Chemical Co.) is a chlorinated eucalyptus oil containing 30 per cent of chlorine in relatively stable combination. It is claimed to be a new "chlorinated antiseptic", highly efficient as a wound antiseptic. It is proposed for use in local infections, burns and as an antiseptic in the alimentary and urinary tract. The laboratory investigation made in the A. M. A. Chemical Laboratory and by the referee of the Council on Pharmacy and Chemistry who was in charge of the product showed that Chlorlytus is a feeble antiseptic, considerably weaker than eucalyptus oil.

Iron, Arsenic and Phosphorus Compound.—The Council on Pharmacy and Chemistry reports that Hypodermic Solution No. 13 Iron, Arsenic and Phosphorus Compound (Burdick-Abel Laboratory) was found unacceptable for New and Non-official Remedies for the following reasons: 1. It does not contain ferrous citrate as claimed; instead, the iron is in the ferric condition, apparently in the form of the unofficial and unstandardized "iron citrate green" for which there is no evidence of superiority over the official iron and ammonium citrate. 2. Its name gives no information on the form in which the iron, the arsenic or the phosphorus occurs therein. The term "arsenic" does not indicate that the preparation contains the mild cacodylate. Nor does the term "phosphorus" tell that it contains the practically inert sodium glycerophosphate. 3. The preparation is unscientific because (a) it is irrational to prescribe iron and arsenic in fixed proportions; (b) there is no evidence that the hypodermic or intramuscular administration of iron has any advantage over its oral administration, and (c) glycerophosphates have not been shown to have properties other than inorganic phosphates, and hence the administration of sodium glycerophosphate as a hematinic is illogical (Jour. A. M. A., Nov. 13, 1920, p. 1358).

Parathesin Not Admitted To N. N. R.—The Council on Pharmacy and Chemistry reports that the local anesthetic ethyl paraminobenzoate was first introduced as "Anesthesin" or "Anaesthesin"; that the product is not patented in the United States, and that it may be manufactured by any firm which chooses to do so. In order that a common name for the drug might be available, the Council coined the short, easily remembered and descriptive name "Benzocaine". As the term "Anesthesin" had become a common name for the drug, the Council also recognized this as a synonym for benzocaine. While the Council had previously recognized the brand of benzocaine manufactured by the H. A. Metz Laboratories, Inc., under the name "Anesthesin", this firm requested recognition of the product as "Parathesin". As the use of one substance under several names causes confusion and retards rational therapeutics, the Council's rules provide against the recognition of proprietary

names for nonproprietary, established drugs. For this reason, and because the legitimate interests of the manufacturer may be safeguarded by appending his name or initials to the common name, benzocaine or anesthesin, the Council refused recognition to the designation "Parathesin" (Jour. A. M. A., Nov. 13, 1920, p. 1358).

OF GENERAL INTEREST

Dr. Brelsford of Denver, Colo., will be the medical director at Sunnyrest Sanitarium.

Dr. F. E. Best, who has been in the service, will return to Wells about January 1st.

The Minnesota State Sanitary Conference held a meeting in St. Paul, November 17th.

Dr. F. L. Durgan of Winnebago will be the residence physician at the Nopeming Sanitarium.

Dr. J. B. Stevens of Sioux Falls will locate in Luverne and will become associated with Dr. C. L. Sherman.

Dr. C. W. Kanne has moved from Arlington to Faribault where he will specialize in obstetrics and gynecology.

Dr. C. H. Cherry of the Rood hospital staff of Chisholm will move to Minneapolis and associate himself with Dr. Mathews.

The November meeting of the Minnesota Academy of Ophthalmology and Oto-laryngology was held in Rochester, November 15.

Sister Irene Anderson, R. N., of Bethesda hospital, St. Paul, is taking a post graduate course at the Lankenau hospital, Philadelphia.

Dr. George Douglas Brand announces the opening of his offices at 535 Lowry Building, St. Paul, for the practice of medicine and surgery.

Dr. H. W. Orr, of Lincoln, Neb., delivered a Mayo Foundation lecture in Rochester, Thursday, December 2, on "The Treatment of Spinal Injuries."

Dr. Wilford Nelson, who has been an interne in a Harvard, Mass., hospital will locate in Fergus Falls and will be associated with Dr. J. A. Freeborn.

The physicians and dentists of Minneapolis will erect a building of twelve stories. A corner lot at 12th street and Mary place has been purchased.

The thirty-sixth annual meeting of the Southwestern Minnesota Medical Society was held in Pipestone November 11th. The May meeting will be held in Fulda.

At the Centennial Celebration of the University of Cincinnati the honorary degree of Doctor of Science was conferred on Dr. Edward C. Rosenow of Rochester.

Dr. C. M. Jackson, Professor of Anatomy, University of Minnesota, delivered one of a series of Mayo Foundation Lectures on the History of Medicine, December 16 on "History of Anatomy."

Dr. F. F. Callahan, resident superintendent at Pokagama Sanatorium, addressed the American Sana-

torium Association at its midwinter meeting at Rochester, N. L., on the early diagnosis of tuberculosis.

The Pokegama Fellowship in Tuberculosis has been established at the Pokegama Sanatorium for University of Minnesota graduates. This fellowship is included in the graduate school and carries with it a yearly stipend of one thousand dollars.

The Sivertsen Clinic has been organized with offices at Twenty-fourth avenue South and Sixth Street, Minneapolis. The members of the clinic are Drs. Ivar Sivertsen, F. J. Souba, M. Sundt, A. Sivertsen, R. C. Logefell, R. I. Dorge and G. M. Lishernes.

Dr. Norman M. Keith, former Clinician in Medicine in the Faculty of Medicine of the University of Toronto, has gone to Rochester, Minn., to be associated with Dr. Rowntree and Dr. Fitz in further development of research in internal medicine and in the hospital care of patients with medical conditions.

In a recent bulletin the U. S. Department of Agriculture states that assure killing trichinae in pork the meat should be boiled fifteen minutes (summer) to eighteen minutes (winter) for each pound of weight. If the meat is put into cold water deduct half the time required to bring the water to a boil.

Civil service examinations are scheduled to be held at the various civil service centers throughout the state. On January 19th and March 9th, 1921, examinations will be held for physicians for the Panama Canal Service; on March 1, 1921, for Saint Elizabeth's Hospital internship. Those interested may obtain the details from any of the civil service officers scattered throughout the state.

Late in October a meeting of the general staff of the Mayo Clinic was held in honor of Sir Berkley Moynihan and Sir William Taylor who returned with Dr. W. J. Mayo to the Clinic from the meeting of the American College of Surgeons. Sir William Taylor, ex-president of the Royal College of Surgeons of Ireland, gave a short talk on the history of that organization which was established in 1774 by Royal Charter. Sir Berkley Moynihan outlined the John B. Murphy Oration on Surgery delivered by him at the meeting of the American College of Surgeons.

St. Louis University, the oldest seat of learning west of the Mississippi river, has for the first time in its more than a century of endeavor made a public appeal for funds, the larger portion of which are to be applied to the support of the Colleges of Medicine and Dentistry. The university has asked its alumni and friends to raise the sum of \$3,000,000 as a Centennial Endowment Fund, in commemoration of the 100th anniversary of the founding of the institution. The anniversary occurred in 1918, but because of war conditions existing at that time, with over 3,000 of the undergraduates and alumni of the university having answered the call to arms, the celebration was postponed until conditions were more nearly normal.

Of the \$3,000,000 asked, the income on \$1,500,000 is for salaries of the teaching staffs of the two colleges;

the cost of a new laboratory for the school of medicine is estimated at \$250,000; new buildings and clinics for the Schools of Medicine and Dentistry will cost an additional \$550,000. The remainder of the \$3,000,000 will be applied to the needs of the Institute of Law, School of Commerce and Finance, and the College of Arts and Sciences. It is hoped by the Faculty that old graduates of the Medical and Dental Colleges of the University, who are now scattered all over the world, will appoint themselves a committee of one to aid their Alma Mater to realize the Centennial Fund.

The State Board of Health, in cooperation with the city health department of Virginia, has opened a free clinic for venereal disease. This clinic is held in the Virginia City hospital and is open at 8 o'clock on Mondays for men and at the same hour on Thursdays for women. The physicians in charge at this clinic are Dr. W. M. Emple and Dr. H. T. Ground. All physicians on the range are invited to send to this clinic persons applying for treatment for venereal disease, who are unable to pay a physician's fee. This makes the fifth of the group of free clinics operated by the State Board of Health jointly with local agencies. The others are located in Minneapolis, St. Paul and Duluth.

The American College of Surgeons elected the following Minnesota surgeons, candidates for fellowship at their eighth annual meeting at Montreal in October: Drs. A. E. Booth, Minneapolis; Paul Brown, Minneapolis; J. L. Butsch, Rochester; C. M. Carlaw, Minneapolis; W. C. Carroll, St. Paul; T. L. Chapman, Duluth; C. C. Chatterton, St. Paul; H. S. Clark, Minneapolis; C. D. Conkey, Duluth; J. A. Evert, Brainerd; E. K. Green, Minneapolis; S. W. Harrington, Rochester; H. Holte, Crookston; E. M. Jones, St. Paul; C. L. Larsen, St. Paul; V. N. Leonard, Duluth; A. L. Lockwood, Rochester; C. E. Lum, Minneapolis; C. O. Maland, Minneapolis; F. E. McEvoy, Rochester; F. A. Olson, Minneapolis; O. W. Parker, Ely; S. C. Schmitt, Minneapolis; F. C. Schuldt, St. Paul; F. J. Souba, Minneapolis, and J. C. Staley, St. Paul.

Dr. Stokes, of the Mayo Clinic recently attended the joint meeting of the Chicago Dermatological and St. Louis Dermatological Societies in St. Louis. He read a paper, "The problem of syphilis in general diagnosis," before the Southwestern Medical Society in Wichita, Kansas. From Kansas he went to New York City and spent two days in studying the Bertillon system of anthropometric measurements to be applied in a study of heredito-syphilis. Dr. Stokes later went to Washington, D. C. to deliver a series of seven lectures before the Institute of Venereal Disease Control and Social Hygiene, which was held by the United States Public Health Service during the first week in December. This institute is a ten-day free course for all physicians, chiefs of clinics, and others interested in the management of syphilis and gonorrhoea. The medical faculty includes Dr. Fordyce and Dr. Keys of New York City, Dr. Hugh

Young of Baltimore, Dr. Irvine of Minneapolis and other specialists. Following the Institute, a conference on the social aspect of venereal disease will be held in Washington which will include representatives from Europe and South American countries; at this time an effort will be made to formulate a policy with reference to venereal disease and social hygiene.

On Wednesday, December 8th, about fifty former medical officers gathered together in St. Paul to renew old acquaintances and swap stories of their experiences during their service in the late war. At this meeting it was decided to have a general reunion of all the former medical officers of the Northwest, in St. Paul on the evening of Jan. 11th, 1921 during Clinic Week. The following committee was appointed: Dr. T. J. Maloney, Chairman; Dr. F. J. Savage, Sec.; Dr. Charles Freeman, Dr. Knox Bacon. This committee were directed to send out announcements and to look after the details of the coming good time. It was further decided that this should be an informal affair giving everyone the opportunity of meeting the fellows he wants to see and to talk over the times that were times. It was further thought possible that a Medical Officers Society of the Northwest might be formed at this time. The committee looking for cooperation consulted Lt. Col. Rutherford, Surgeon at Fort Snelling and received a pleasant surprise. Col. Rutherford has invited all the Medical Officers to the Fort on Tuesday evening Jan. 11th, 1921 to participate in a real old army mess and get-together. From his description there will be nothing left out. The committee is indebted to Col. Bjornsted and Lt. Col. Rutherford, for throwing the Post wide open to the Medical Officers and we can now all be assured that a real get-together of real fellows under real conditions will take place on Jan. 11th, 1921.

NEWS OF THE HOSPITALS

Mrs. B. Morris, formerly superintendent of Mounds Park Sanitarium, was recently married to Dr. M. M. Ghent, a well known St. Paul physician and a member of the hospital staff. Since the sanitarium took over the Cobb and Midway hospitals, the former institution has been renovated throughout and will accommodate only women patients. Midway will continue to operate as a general hospital under the direction of Miss A. Friedsburg.

Dr. F. J. Mitchell of the St. Paul hospital has been in the east for the past two months. Recently the hospital installed the Scanlan-Morris high pressure sterilizers.

Eighteen members of the probation class gave a highly satisfying demonstration the first part of December to the staff of St. Luke's hospital. Miss Wunch, a graduate of John Hopkins has been placed in charge of the obstetrical department. Additional

facilities for administering x-ray treatment have been installed by Dr. Schons, roentgenologist of the staff. Mrs. J. B. Hoxis former president of the hospital was a visitor recently from California. Alexander Cathcart is now president. Henceforth St. Luke's will be known as the hospital of Protestant churches, the articles of incorporation having been changed. Each denomination will have representation on the board. The institution was formerly under Episcopal jurisdiction.

Under the supervision of William Mills, superintendent, the dormitory of the Swedish hospital has been remodeled. Twenty-four new beds will be added. Radium service has been inaugurated; and the maternity department has been enlarged to accommodate thirty patients. Mr. Olson, former superintendent is now in charge of the P. & H. S. of M.

Sister Lena Nelson, former superintendent of the Norwegian Lutheran Hospital has been succeeded by Sister Marie Follvard, who has brought about the remodeling of the Pathological and x-ray departments.

St. Barnabas hospital has been highly commended for its treatment of soldier patients. At present there are from fifty to sixty at the hospital. They occupy the annex and enjoy the recreative and vocational facilities that the institution has provided. Dr. Kano Ikeda, who has charge of the Pathological and x-ray departments will conduct the metabolic laboratory that has been added.

The old delivery room of the Hillcrest hospital has been remodeled into a nursery, since a new delivery room has been prepared.

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH,
THOMAS A. PEPPARD
LA SALLE BLDG., MINNEAPOLIS

INTESTINAL TUBERCULOSIS: Robert C. Pater-son (Amer. Rev. of Tub., Aug., 1920). In the past intestinal tuberculosis has been considered a well nigh hopeless complication of pulmonary tuberculosis. We are now beginning to detect this complication in its earliest stage in many cases before symptoms are present and others with only slight digestive disturbances complained of.

Routine X-ray studies of the intestinal tract of all cases of pulmonary tuberculosis is chiefly responsible for the early diagnosis of tuberculous ileo-colitis. The lesions are chiefly ulceration and a certain amount of fibrosis or inflammatory thickening around the ulcer. The mode of infection is probably hematogenous.

The author reviews the symptoms usually asso-

ciated with intestinal tuberculosis but considers the greatest help to be an X-ray examination after a barium meal. The most characteristic finding when tuberculous ulcerations are present, are (1) hypermotility of the intestines, (2) ileal stasis, and (3) filling defects. These characteristic findings are present in cases where ulceration of the caecum or ascending colon exists. No diagnostic picture of small intestine ulceration has yet been found. The course of the disease is progressive but healing, in the experience of the author, does occur in a very small number of patients.

Medical treatment is palliative at its best so the author advocates surgery for suitable cases. The surgical procedures are (1) excision of all the diseased portion (usually impracticable); (2) anastomosis of healthy bowel above site of disease into healthy bowel below with exclusion of diseased area and fistula formation to drain ulcerated bowel; (3) ileostomy above the disease; (4) simple appendectomy in cases where pain has been a prominent symptom has given marked relief.

Before operation should be resorted to the pulmonary condition should be most carefully looked into. With progressive trouble in the lungs the operation will be a danger but if the pulmonary lesion is stationary or inactive and the patient's symptoms chiefly caused by intestinal disease, operation is justifiable. In other words the prognosis depends more on the lungs than on the intestines.

The extent of the intestinal lesion can not be predicted by present methods of examination. Numerous laparotomies have demonstrated this. Hence operation should be looked upon as more or less exploratory.

At the end of this article the author gives brief reviews of 22 cases which were operated with the following results:

Alive and well	6	27.2%
Alive and improved	4	18.2%
Alive and unimproved	4	18.2%
Dead	8	36.4%
	22	100.0%

EVERETT K. GEER.

SOME OBSERVATIONS ON EPILEPTICS AND ON EPILEPSY, CHIEFLY FROM A ROENTGEN RAY STANDPOINT: Thomas M. T. McKennan (Arch. of Neur. and Psy., Sept., 1920). The causes and nature of so-called essential epilepsy are particularly worthy of such consideration and attention that would assist in lifting them from the realms of the vague and the obscure. McKennan quotes from the work of Johnston and Henninger, and reports a study of his own on 90 cases of epilepsy. He finds bony overgrowth or bony deposits about the pituitary area in practically 58% of the cases; in 11% there were smaller pituitary areas than normally; cerebropathy in 10%; tumors or evidence of pressure in the inter-

pituitary area 10% also; calcareous degeneration in 2.5% and no changes in 8.8%. Intermittent hyperemia in the pituitary gland is held to be the cause of bony overgrowth. The author feels quite satisfied that crippling of the pituitary gland in one way or another; recurring hyperemia of the gland; a small inefficient gland; or struma or simple hypertrophy may be looked upon as the cause of essential epilepsy.

Granting the above findings it would however, still be too early to sit back complacently while contemplating on the etiology of epilepsy for how are we going to explain the recurring hyperemia, what is the more basic cause and the more primary mechanism? The very nature of the periodicity, one would surmise, suggests an influence by, or association with, other glandular functions.

J. C. MICHAEL

EPIDEMIC ENCEPHALITIS (WITH A REVIEW OF 115 AMERICAN CASES).

Arthur D. Dunn and Francis W. Heagey (Am. Jour. Med. Sc., Oct., 1920). A brief review of the history is given. The specific etiological factor has as yet not been isolated, but as predisposing factors, 36 of the 115 cases gave a history of a previous respiratory infection within one year prior to the onset of the disease. The symptomatology of the disease is described as being most protean. The authors have endeavored to classify various forms of the disease from the clinical standpoint, but the classification is by necessity somewhat arbitrary. Some of the most common special symptoms are considered, and their frequency noted. Ocular disturbances are frequent. Of the 115 cases, there were third nerve palsies in 63, and sixth nerve palsies in 39. Diplopia was recorded in 55 cases, with ptosis in 21. The absence of fourth nerve, involvement is striking, in view of the anatomical proximity of its nucleus to that of the third nerve. The greatest importance is attached to the presence of ocular symptoms, the authors giving it priority in significance over lethargy and the atypical spinal fluid. The other cranial nerves were less frequently involved, but the seventh was next in frequency with an incidence of 15 occurrences in the 115 cases. Polypnea occurred in 3 of the total series of cases. Lethargy in varying degrees occurred in 79 cases, and was the first symptom in 34. Catalepsy and catatonia occurred in 26 cases, and headache in 54. Rigidity of the neck, if present, is not as a rule very marked. Tremor was present in 35 cases, but tremor or twitching of the abdominal muscles has not occurred as frequently as one would be led to conclude from Riley's & Bassoe's articles. Disturbance in the reflexes are extremely varying and atypical, but disturbances were noted in 31 cases. Peripheral change was noted in 26 cases. The authors believe that perspiration is a frequent symptom, but according to the literature, rather rare. Fifty of the cases were characterized by a complete absence of fever. The average maximum tempera-

ture was 102°, and except in the lethal cases never rose to a point higher than 105°.

The laboratory findings were characterized by an absence of uniform findings. The highest leukocyte count was found to be 22,000, and the average was 10,200.

The urinary examinations were inconclusive, and practically all were negative.

The cell count of the spinal fluid, although frequently normal, was found to be, nevertheless, frequently increased, and the average for 64 spinal fluid examinations of 100 collected cases in the literature was 16 cells per cubic millimeter. The globulin test was positive in over 50 per cent. Pressure was increased in only 10 per cent.

Tilney and Riley and Bassoe have given us the most information in America concerning the pathology. The chief findings are summed up as follows: (1) Meningeal edema and thickening; (2) softening and congestion of both gray and white matter of the brain and pituitary gland; (3) punctate hemorrhages into the mesencephalon and thalamus and the basal ganglia; (4) thrombosis of small vessels; (5) perivascular infiltration of small vessels; (6) edema of the mesencephalic area.

Thirty-one of the 100 cases from the American literature died. In the authors' series, 4 out of 15 died. Recovery is usually slow, and disturbances in cerebation took on the average three to four months to clear up. Facial nerve palsies lasted four or five months. The Asthenia, depression and dizziness persisted seven months on an average. The longer the course of the disease the better the chances of recovery.

There is no specific treatment. Lumbar puncture seemed to be of benefit in the majority of cases. Urotropin has been used empirically; there is very little to support its efficacy. F. J. HIRSCHBOECK.

SURGERY

SUPERVISORS:

E. MENDELSSOHN JONES
LOWRY BLDG., ST. PAUL.
VERNE C. HUNT,
MAYO CLINIC, ROCHESTER.

SOME PRINCIPLES INVOLVED IN THE TREATMENT OF EMPYEMA: Evarts A. Graham, (Surg., Gyn. and Ob., July, 1920). The recent extensive literature on empyema reveals both a striking tendency toward a more or less standardized treatment and a radical departure from methods in use prior to the war.

The author points out that the essential principles involved are: (1) The avoidance of an open pneumothorax in the acute stage during active pneumonia; (2) the early sterilization and obliteration of the cavity, and (3) the maintenance of the patient's

nutrition. He has shown by experiments on living dogs that the former prevalent conceptions of the mechanism of action of an open pneumothorax are incorrect.

In the normal thorax the mediastinal structures, instead of constituting a more or less rigid partition between the two pleural cavities, are in reality so mobile that they offer a resistance to air pressure which is equivalent to the pressure exerted by a column of water only 0.5 to 1.0 centimeters high. This resistance is, therefore, negligible, and from the standpoint of pressure relationship the thorax can be considered as one cavity instead of two. Any change of pressure in one pleural cavity will manifest itself to practically the same degree in the other pleural cavity, with the result that both lungs will be about equally compressed. The situation in this respect is the same in the dog as in man, and, therefore, experimental results obtained on the dog can be directly applied to man.

Fatal asphyxia as a result of an open pneumothorax depends upon several factors, the important of which are the size of the opening and the vital capacity of the individual.

It is possible, by a mathematical expression, to approximate in a given case the maximum non-fatal opening in the chest wall if the vital capacity is known. A person with an average vital capacity (3700 c. c.) and a normal thorax can withstand an opening in the chest wall of fifty-one square centimeters, but the person with an exceptional vital capacity (as, for example, 7100 c. c.) can live with an opening 101 square centimeters. A bilateral open pneumothorax is practically no more dangerous to life than a unilateral opening, provided that in each case the areas of the openings are the same. If the vital capacity is so low as to approximate the tidal air, even a very small opening may be fatal.

These observations have a very important bearing on the question of open drainage cases of empyema, particularly during the acute pneumonic stage when the vital capacity is low. After adhesions have formed and the mediastinum has become somewhat stabilized, both by adhesions and inflammatory induration, then the pressure relationships may be materially different on the two sides.

Effects of an open pneumothorax other than those directly upon the lungs are briefly discussed by the author, such as heat loss, changes in the systemic circulation, and danger of infection.

The value of Dakin's solution in sterilizing and obliterating empyemic cavities as well as its power to decorticate lungs, is shown. Collapsing thoracoplastic operations have the disadvantage, even when successful, of apparently permanently reducing the vital capacity. The maintenance of the patient's nutrition is most important.

FRED R. SANDERSON.

URETERO-URETERAL ANASTOMOSIS: Reuben Peterson, (Surg., Gyn. and Ob., vol. 31, No. 2, pp. 132-142). The author reports a case of section of

the right ureter during an abdominal hysterectomy for cancer of the uterus. An anastomosis of the ureter was made by the end-to-end technique which he describes. Examination of the patient seven months later showed a good functioning ureter. In the roentgenogram the ureter appeared to be dilated to some extent throughout its entire length, and there was some dilatation of the pelvis and terminal calices. A No. 6-F. catheter was passed up both ureters without meeting obstruction. By the phenol-sulphonaphthalein test there was a return of 5 per cent of the dye from the right kidney and 10 per cent from the left kidney in ten minutes. Bacteriological study of urine from the right kidney did not disclose organisms. The capacity of the right renal pelvis was 16 c. c.

The author collected seventy-two cases from the literature in which uretero-ureteral anastomosis had been made by various methods. Four deaths in this series were attributable to the ureteral anastomosis, giving a primary mortality of 5.5 per cent. The author does not believe it is necessary to employ the end-to-side method of anastomosis in preference to end-in-end in order to avoid stricture at the point of anastomosis. The end-in-side anastomosis is the simplest of all methods and sacrifices but a small portion of the ureter, since it is necessary to invaginate only from one-fourth to one-third of an inch of the proximal portion of the ureter. If a large portion of the ureter is removed, the author prefers to loosen up the bladder or kidney, when an end-to-end anastomosis can be made without undue tension on the ureter. Retroperitoneal drainage is advocated. Contact of the drain with the end of anastomosis is, however, avoided. Should temporary leakage occur, covering the anastomosis with peritoneum prevents any urinary contamination of the peritoneal cavity.

In order to determine the results of uretero-ureteral anastomosis subsequent examinations of the bladder, ureter, and kidney must be made, functional tests must be performed, and the condition of the urinary tract demonstrated by x-ray examination. Without such investigation it may develop that the cured patient has an atrophic or hydronephrotic kidney with a functionless ureter, and with the opposite kidney doing double work. When the uretero-ureteral anastomosis is not followed by leakage, there is an excellent chance for a good surgical and functional result, but with leakage following, success is rare. In case of permanent leakage, nephrectomy may be indicated in preference to a second attempt to repair the ureter.

V. C. HUNT.

INFECTIONS OF BONES AND JOINTS: Frederic J. Cotton (Surg. Gyn. Obs., Sept., 1920). The principles of treatment of bone and joint infections, which have been developed in the recent war, can with certain modifications be applied to the conditions met in civil practice.

In case of the compound fracture, the early debridement, while not as extensive as that advocated by the majority of military surgeons, aids in limiting infections and in treating secondary infections and in keeping track of the necrosed bone fragments. Generally speaking, a procedure which is both wise and beneficial is to remove no bone early when there is an infection, to insure wide open drainage, disinfect and wait for demarcation of necrosed bone. Each case must be treated to insure accurate adjustment and best contact of fragments so that repair can proceed unobstructed after sepsis is controlled. Various splints have been devised and each has its limitations. The question of union remains after sepsis has been controlled. A variety of causes of non-union exist. Briefly, the most important are: the amount of trauma, devitalized tissue both bony and muscular. Various procedures have been used from time to time. Bone grafts, use of magnesium and insoluble lime salts and certain general systemic measures, such as the use of salvarsan, thyroid extract, etc., while more or less experimental, it is hoped will aid in the cure of clean non-unions and of septic cases by depositing nutrient and stimulant materials in the gap.

In osteomyelitis of the haematogenous type, there are certain points in the pathology which influence the method of procedure. In general, these are: the possibility of lymphatic transfer from local focus of sepsis in a limb to the bone at a higher level, the variability of the amount of bone destruction in any case of osteomyelitis, the spontaneous healing of the so-called Brodie's abscess, the slow periosteal repair after formation of involucrum. In the diagnosis of this condition, any case presenting bone tenderness, with or without fever or pain, must be regarded as suspicious. The presence of a sinus leading towards a bone is a condition to be inquired into. In differential diagnosis, scurvy in children, syphilis and tuberculosis are the most prominent conditions to be ruled out.

The treatment of osteomyelitis is summed up under following heads: first—abortive treatment consisting of early drainage before bone destruction; second—trephining, drainage, disinfection and secondary removal of sequestra in cases of small amount of bone drainage; third—drainage and disinfection in case of considerable bone necrosis, with removal of sequestra when demarcation has taken place; fourth—in case of total sequestrum, sub-periosteal resection when X-ray shows regeneration of new bone; fifth—in case of large involucrum surrounding sequestra, opening of shell with removal of sequestra, leaving a trough to be treated with bone wax, Dakin irrigation, turned in flaps of skin, muscle or fat; sixth—in case of sinus formation, open trough drainage with Carrel-Dakin treatment; seventh—in late and protracted cases, trough drainage, chlorinization disinfection, then bone wax filling. Those cases may

be disinfected by use of 95% carbolic and alcohol method and use of bone wax in cavity.

Infected joints may be divided into two main classes each with their own special treatment—First, the early cases in which there are no bone lesions are treated by opening wide and mobilizing to the limit from the start with or without disinfection of Dakin's solution, the Willems' method, or opening joint and irrigating with normal salt and corrosive solution 1-15000 with closure of capsule and mobilization after a few days. Second, the later cases with adhesions limiting motions are treated by forcible breaking up of adhesions under anesthesia carefully done, followed by fleeting fixation in the optimum position for the given joint, early and careful heat and massage and "active" not passive motions.

G. K. WILLIAMS.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

ARCHIBALD L. McDONALD,
FIDELITY BLDG., DULUTH.

ALBERT G. SCHULZE,
LOWRY BLDG., ST. PAUL.

CERVICAL EROSIONS: Philip J. Reel (Ann. of Surg., Vol. 71, No. 2). The author brings out several more or less generally accepted facts concerning this common and persistent condition.

1. It is not a true erosion at all but really a proliferating adenoma.

2. It is due to exposure of the columnar cervical endometrium to the acid secretion of the vagina and, to infection. The most common cause is laceration of the cervix with eversion of the cervical lips.

3. Eden and Lockyer distinguish three types.

(a) Follicular, with retention of secretion in the cervical glands, with distention and formation of "Nabothian Cysts".

(b) Papillary erosion with hypertrophy of stroma and projection.

(c) A combination of the two forms.

4. Symptoms are: vaginal discharge, menorrhagia due to associated subinvolution, and subsequent sterility.

5. Treatment—The author's best results have been obtained with: rest, alkaline douches, curettage, and amputation of the cervix in severe cases.

ARCHIBALD L. McDONALD.

CONSIDERATIONS OF SURGICAL HAZARDS IN DIABETIC PATIENTS:

Nellis B. Foster (Ann. of Surg., Vol. 71, No. 3). This is of direct interest to gynecologists since the author states that 60 per cent of the fatalities in diabetics beyond the third decade, follow surgical operations, and that 70 per cent of these die in coma. Most of these patients

were considered as mild cases as measured by the degree of glycosuria. This is not a reliable criterion of the severity of the disease. In advanced cases changes in the kidneys occur, characterized by decrease or disappearance of glycosuria but with a high blood sugar content. Infection, acute or chronic and anesthesia, especially ether, tend to increase the blood sugar content. Infection, acute or chronic and hydrates.

As regards the carbon di oxide combining power of the blood, the author considers that this should be 40 per cent or over to offer a reasonable margin of safety. A blood sugar content of 0.35 even in the absence of acidosis is a dangerous amount for a surgical procedure. For such patients the only safety is to improve conditions previous to operation. The use of alkalis is often disappointing on account of insufficient dosage. He advises from 30 to 45 grains per hour, given in Vischy water till the Carbon di oxide is raised to a safe level.

ARCHIBALD L. McDONALD.

OPERATIVE TREATMENT OF CANCER OF THE CERVIX UTERI:

Paul M. Fergue (Arch. Mensueles d'Obstetrique et Gyn., Oct., 1919). In an interesting general review the author discusses four phases of this question. 1. The means of securing early operative treatment. Results of operative treatment should be considered in relation to the number of cases seen and not the number operated upon. There have been few important improvements in operative methods in recent years and hope for more cures is in earlier operation. The crusade must be worked out logically and carried on with perseverance if the results are to be permanent. They find three sources of error and delay: the physician, the midwife, and the patient. As regards physicians, education and experience are demanded. In cancer and in tuberculosis, textbooks dwell on advanced signs when the patients are beyond curative therapeutics. One should suspect any type of intermenstrual bleeding, especially at the menopause, return of periods, watery bloody discharge, or fetid discharge. In all such cases one should insist on: immediate examination, the most rapid precise diagnosis, and immediate operation. Vaginal bimanual examination is of more value than that with a speculum. One should note changes in consistency, lesions of the cervical lips, infiltration of the parametrium, or invasion of the vesico-vaginal, and recto vaginal septa. Biopsy is of great value but not exempt from error. Special study is needed regarding certain "pre-cancerous lesions". In France, the midwives offer a valuable means of spreading propaganda since about 30 per cent of the author's cases were first seen by midwives. For the public, it is necessary to overcome; false modesty, ignorance, fear of hospitals, and of surgical operations; to teach the significance of menstrual irregularity, and the curability of cancer in the early stages.

2. Limits of operability have been widened as a

result of improved technical skill with the Wertheim type of operation. The mortality is still high due to: Hemorrhage, shock, septic cellulitis, involving the exposed retroperitoneal tissues, peritonitis, and embolism. Vaginal examination does not always settle the question of operability and this should not be settled without laparotomy.

3. Choice of operation and technical considerations. Intervention for radical cure must include a wide excision of the parametrium with the uterus and dissection of the ureters. The author prefers the double operation i. e. preliminary vaginal dissection of the cervix, and a wide abdominal panhysterectomy. Their present technique is based on the Wertheim, Clark and Reis. Vaginal hysterectomy is reserved for handicapped cases; obese women or those with poor resistance.

The chief aims today are to: (a) reduce mortality, (b) prevent recurrence.

(a) To reduce mortality the most important factor is infection and sepsis, since this covers the largest number of deaths, including some listed under other factors. It is most important that the raw surfaces be protected from contamination from the vagina, and cervix, or from salpinxitis or pyometrial collections. The safest method is the removal of the cervix and vaginal cuff as a closed sac, either by means of special clamps, or by preliminary vaginal dissection and closure of the vaginal flaps by sutures. The author prefers the latter method since the vaginal dissection permits more free mobilization of the uterus in the abdominal part of the operation. He recommends the use of compresses clamped to the skin wound and complete isolation of the pelvis by packing. Two per cent formalin is used to disinfect the vagina. The peritoneal surfaces are carefully approximated, and the sigmoid is used to further isolate the pelvis. Vaginal drainage is commonly used.

(b) To prevent recurrence he suggests: improved technique and accurate hemostasis to permit of wide dissection of the parametrium and routine isolation of the ureters. He prefers spinal anesthesia. In general extensive induration gives a bad prognosis, but often includes much inflammatory non-malignant tissue. Excision of lymphnodes is limited to palpable masses in the pelvic wall near the bifurcation of the iliac vessels. It is not possible to remove the lymphatics 'en bloc' or to compare cancer of the uterus to that of the breast.

4. Recurrences: 50 per cent occur within the first year, 25 per cent more in the second so that after three years the prognosis is good, but he still accepts the five year limit. Cancer of the fundus gives a favorable prognosis in from 75 to 80 per cent. Cylindrical cell cancer of the cervix gives more recurrences than squamous cell type, as do those in young women.

ARCHIBALD L. McDONALD.

PEDIATRICS

SUPERVISORS:

FREDERICK C. RODDA,
SYNDICATE BLDG., MINNEAPOLIS.

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO.

FURTHER STUDIES IN THICK CEREAL FEEDING IN MALNUTRITION IN INFANCY: Harold R. Mixsell (Arch. of Ped., Aug., 1920). In the August number of 1920 of the Archives of Pediatrics, Dr. Mixsell reports two selected cases of thick cereal feeding for poorly nourished infants, in addition to twelve cases reported in August, 1919.

He employs a fat free milk or one averaging under one per cent in fat, as the liquid basis of the mixture, thus relieving the infant of the often poorly assimilated fat, and at the same time obtaining the high protein and salt content of the skim milk that would be lost if water were used. Farina is preferred as the cereal because of its colloidal qualities and the thickness of the mixture it produces. One tablespoon of farina to 5 or 6 ounces of skimmed milk is used; with two level tablespoonfuls of cane sugar and two level tablespoonfuls of dextri maltose to each 30 ounces of the mixture, all to be well cooked, from 30 to 60 minutes.

By thus combining several different carbohydrates, the absorption is slow and the child is enabled to utilize a large amount of sugar without danger of a sudden overdose which would tend to create a carbohydrate diarrhea. If difficulty is met with in getting the baby to take the cereal, the cane sugar may be increased to add more sweetness. Where signs of pylorospasm have appeared in these cases, the vomiting has ceased after a few weeks use of the cereal.

Two to six ounces of green vegetable puree may be added as early as the sixth month when the child has become accustomed to the farina mixture. Celery, string beans, spinach, carrots and young turnips are preferred, and supply, besides the extra calories and salts, the water soluble B vitamins which stimulates growth, and in which the cow's milk is deficient. With this cereal mixture, the baby is able to take an extremely large number of calories, in many cases over double the number required by its weight, and it will tolerate this feeding over a longer period of time than any other high caloric feeding.

The first case report is of a child 5½ months of age who failed to gain properly in spite of the use of many feeding formulae, including modified milk, skimmed milk mixtures, Dryco dry milk, Walker-Gordon milk, cereal, beef juice, and orange juice, with both high and low sugar feedings. The farina mixture was prescribed with an almost startling change for the better and a gain in weight of 23 ounces in eleven days, which settled down to an average gain of nine ounces a week, and brought

the baby up to a normal weight of 25 pounds at one year of age. From four to eight ounces of water was allowed twice a day.

The second case reported was the child of a mother 40 years of age, delivered after protracted difficult labor. It had been on a milk mixture from two months of age, and had vomited after almost every feeding. At 5½ months, the farina mixture was prescribed and the child started to gain slowly, and the vomiting gradually ceased. Although the results were not particularly encouraging in this case, the child did better on the cereal than on any other feeding, it being an extremely difficult case, the malnutrition possibly having been the result of a slight brain injury at birth.

Dr. Mixsell concludes from his work that the farina feeding, while not a panacea for all feeding ills, is at least one method of handling difficult cases, and, in selected patients, is accompanied by marked gain in weight and general physical improvement.

N. O. PEARCE.

FURTHER PROGRESS IN THE STUDY OF THE RELATIVE EFFICIENCY OF THE DIFFERENT MERCURIAL PREPARATIONS: Walter R. Ramsey and O. A. Groebner (*Amer. Jour. of Dis. of Child.*, Sept., 1920). The treatment of syphilis with the different mercurial preparations is still a haphazard affair. Assuming that the amount of mercury eliminated in the urine during a given time would give a fair index of the amount in the circulation we have been able to draw the following conclusions:

1. Mercurial ointment, 50 per cent, is to be preferred to the less concentrated forms and need not be repeated more often than twice weekly instead of daily. The reason for this is, that the elimination of the mercury begins soon after the administration, the maximum elimination occurring during the following three days, and being fairly complete within five days. When double the amount was used, that is, 2 gm. the elimination was relatively larger. The quantity of mercury absorbed is much increased by friction.

2. Calomel ointment is absorbed but less rapidly and to a less extent than the mercurial ointment and should, therefore, be given in greater concentration.

3. Salicylate of mercury in oil should be given hypodermically twice weekly instead of once.

4. The mercuric chlorid, by hypodermic injections, although the dose is very small, continues to be eliminated for six or seven days. The fact, however, that its use frequently is followed by the appearance of protein in the urine should exclude it from the treatment of syphilis in children.

5. Calomel by the mouth is absorbed in small amounts, and continues to be eliminated for a considerable time so that it is probable that it would be sufficient to give it at intervals of several days, thus avoiding diarrhea.

6. Gray powder is absorbed to a small degree and eliminated rather rapidly so that large doses repeated daily would probably be necessary to maintain mercury in the circulation.

R. N. ANDREWS.

TREATMENT OF WHOOPING COUGH WITH ETHER INJECTIONS: Deherridon (*Med. Rec.*, Aug., 1920; Original Article in the *Jour. of Med. Sc.*, May, 1920). Thirty cases reported treated by Dufourt's technique. This consists in the administration of one c.c. in twenty-four hours in children under one year and 2 c.c. in the same period for older children. This is injected for three days in succession followed by a days omission and then one final injection. Injection made in the buttocks and have never done any harm and are not painful if made deeply. There were five failures in the thirty cases. A number of paroxysms after each injection is used as a measure of benefit while the duration of the disease at the time of the treatment is important also.

In one case, a boy age 5, had whooped for fifteen days at a rate of thirteen paroxysms in twenty-four hours. He received six injections of 2 c.c. each and in eight days was free from all paroxysms.

A child age 3 who had whooped for nine days with ten paroxysms a day received four injections of 2 c.c. each. In six days the paroxysms ceased but there was a relapse seven days later of a milder type which yielded in four days to three injections.

In one patient who had developed bronchopneumonia it served incidentally as a stimulant. The paroxysm of cough which had reached 35 in twenty-four hours improved notably under treatment and after the third injection was reduced in frequency to 15.

R. N. Andrews.

ROENTGENOLOGY

SUPERVISORS:

C. U. DESJARDINS,
MAYO CLINIC, ROCHESTER.

R. G. ALLISON,
SYNDICATE BLDG., MINNEAPOLIS.

TELEROENTGENOGRAPHY OF THE SELLA

TURCICA: C. Harvey Jewett (*Amer. Jr. Roent.*, July, 1920). Author attempts to establish some fairly definite standard of size, shape and normal variations of the sella turcica. The plates of the sella were made with the plate-target distance equal to five feet. By experiment they found that with this plate-target distance there was an increase in the diameter of 5%.

It was found that the normal sella turcicas could be divided into eight groups with a ninth group added for miscellaneous cases.

Group 1. Structurally showed long thin curved posterior clinoid processes with absence of anterior clinoid processes. This group showed the lowest average and highest average measurements of the sella,

both horizontally and vertically; and the highest average anterior-posterior cranial measurements. Group 2. Nearly vertical light weight posterior clinoid processes with wide open infundibulum, and absent or extremely indistinct small anterior clinoid processes. Group 3. Similar to group 1 except for small, slight anterior clinoid processes projecting horizontally backwards. Group 4. Very heavy anterior clinoid processes projecting directly backwards and occupying a somewhat lower level than the tip of the posterior processes. Group 5. Appearance of a shallow floor with very indistinct thick processes and very wide infundibular spaces.

Group 6. Appearance of complete bridging over of the sella turcica, most of the cases showing heavy processes. Measurements of the sella turcica were smallest in this group. Showed also the shortest longitudinal and the longest vertical cranial diameters. Group 7. Similar to group 3 but most cases show anterior and posterior clinoid processes of about equal length with small infundibular spaces. This group is characterized by the greatest weight and the shortest height. Group 8. Similar to group 2. Thin, nearly perpendicular posterior clinoid processes with wide infundibulum spaces; but in addition has small but indistinct anterior clinoid processes.

No definite relation between weight, height and age, and the size or formation of the sella turcica was observed. Unusual conditions of the sella should be closely correlated with other clinical data before coming to any conclusion.

R. G. ALLISON.

EFFECTS OF RADIUM ON NORMAL BRAIN TISSUE: C. S. Williamson, R. O. Brown, J. W. Butler (Surg. Gyn. and Obst., Sept., 1920). Work undertaken with the idea of determining, as accurately as possible, the safe dosage, the radius of activity, and the degree of reaction produced by a given amount of radium upon normal brain tissue in a known period of time.

In these experiments 50 M. G. were placed directly upon the motor center of the brain of dogs, and were permitted to remain there for 4, 6, 12, and 18 hours. The radium was enclosed in a platinum tube of approximately 0.4 M. M. thickness, which removed the Alpha and practically all the Beta rays, but permitted the passage of the Gamma rays. The protocol of six experiments are given with gross and histological changes in the brain tissue. They cite the following conclusions.

1. The Gamma rays after passing through 0.4 M. M. of platinum penetrate brain tissue and have a destructive action within a radius of 5 M. M., with a dosage of 900 M. G. hours.
2. The effect upon the blood vessels varies according to the distance from the radium and the number of hours employed.
3. The experiments give assurance that, in the case of these brain tumors which respond readily to radium little or no damage will be inflicted upon the brain

tissue surrounding the tumor, if the radium is implanted in the growth. The dosage employed on the growth can be regulated so as to be destructive only to the periphery.

R. G. ALLISON.

BOOK REVIEWS

A MANUAL OF PHYSICAL DIAGNOSIS. By Austin Flint, M. D., L. L. D. Eighth edition, revised by Henry C. Thacher, M. S., M. D. Lea & Febiger, Philadelphia and New York. Price \$3.00. 1920.

In the eighth edition, as in the previous ones, the merits of the book depend on the strong appeal for more careful examinations in searching systematically for the smallest physical signs. These, once located, should be scrupulously analyzed by which manner, more frequently, will correct diagnosis be established and gross errors avoided. It brings very forcibly home, the bitter truth of the modern age, to relegate only too frequently diagnosis to the laboratory. By this procedure clinical observations receive a secondary role in arriving at a diagnosis, which not infrequently is incorrect, bearing out the often repeated statement that a good diagnostician neglects no examination that might contribute a valuable finding, in making a correct diagnosis.

It is almost superfluous to say that the physical signs in this book are considered both in health and disease, and therefore, the differences are so well contrasted, that it requires but little attention in reading, to obtain an invaluable amount of information, both in observing these phenomena and in interpreting their significance. The simplicity, directness, and exactness are additional factors which run through the book, and aiding and facilitating the reader in comprehensively grasping every detail of the subject under discussion.

Then, needless to mention, the medical knowledge obtained during the last few years, both abroad and at home, in peace and in war, during normal conditions of health and disease and abnormal conditions (e. g. epidemics of influenza, trench fever, yellow fever, deficiency diseases) is duly embraced in this volume, making a work most commendable to anyone interested in the progress of medicine.

J. A. LEFAK.

PSYCHOSES OF THE WAR. H. C. Marr, Lt. Col., R. A. M. C. (Temp.) Published by the Joint Committee of Henry Frowde and Hodder & Stoughton, London. \$6.50.

This volume presents the subject of abnormal mental states as observed in war. It covers the psychoses in a general way, various functional nervous conditions and also mental deficiency. It is based on the result of observations of some 18,000 officers and men and these about equally divided between psychoses and functional nervous states. It emphasizes the fact that the war developed nothing new either in psychoses or in functional neuroses

but brought out the same pictures seen in civilian life. The various subjects are illustrated by numerous case histories. It is an interesting work—well written and easily understood.

EDWARD J. ENGBERG.

STUDIES IN NEUROLOGY (In two volumes). By Henry Head, Oxford Medical Publications, 1920. \$17.00.

This two-volume work is for the most part a republication of a series of papers by the author and several associates, covering several distinct themes dealing with various aspects of the functions of the nervous system.

Volume I deals extensively with methods of sensory examination and the clinical application of these methods; with the peripheral nervous system, especially from the standpoint of injury to the peripheral nerves, quoting extensively from "A Human Experiment in Nerve Division", in which the author himself submitted to an experimental excision of a segment of the radial nerve and of the external cutaneous nerve and suture.

Volume II deals with the spinal cord and its afferent impulses, with discussion of cord injuries, also the brain, with special reference to cerebral cortex and sensation, with sensory disturbances in cerebral lesions.

The work is printed upon good paper, is well arranged and has many interesting diagrammatic illustrations.

W. H. HENGSTLER.

WAR NEUROSES AND SHELL SHOCK. By F. W. Mott, M. D. Oxford Medical Publications, 1919. \$6.50.

This volume covers the subject of the various types of neuroses seen under war conditions and discusses the views of the German and French as well as of the English. There are also some interesting and instructive chapters on the physical affects of concussion and of carbon monoxide poisoning and of the effects of irritant gases on the nervous system.

The illustrations are interesting and add materially to the explanation of the conditions presented.

EDWARD J. ENGBERG.

THE SYMPATHETIC NERVOUS SYSTEM IN DISEASE. By Langdon Brown, Oxford Medical Publications, 1920. \$4.25.

This excellent little book is based upon the Croonian Lectures given before the Royal College of Physicians in London in 1918. It does not go into an exhaustive and detailed account of the anatomy of the sympathetic system, but rather brings out the principle plan of it. The author sets forth very clearly and simply the relations of the autonomic system to various large groups of disease, and shows the close interaction of the sympathetic nervous system with the various bodily functions, glandular, reproductive, digestive, etc.

It is a very handy and satisfactory little reference work and one especially adapted to the needs of those who are not students of neurology.

W. H. HENGSTLER.

PHYSICIANS LICENSED TO PRACTICE MEDICINE IN MINNESOTA AT THE OCTOBER (1920) EXAMINATION

BY EXAMINATION

Boothby, Walter M.	Harvard, 1906.	Rochester, Minn.
Cosgriff, Jas. Arthur	Northwestern, 1920.	Minneapolis General Hospital.
Hartley, Everett C. Jr.	U. of Minn., 1918.	Carver, Minn.
Haskins, John LeRoy	U. of Minn., 1916.	Minneapolis, 707 University Av. S. E.
Irvine, Geo. B.	U. of Ill., 1920.	Minneapolis General Hospital.
Jensen, Louis Christian	Northwestern, 1920.	Minneapolis, 914 Elliot Av.
Moss, Myer Norman	Jefferson, 1919.	St. Paul, 641 Grand.
Ogden, Warner	Harvard, 1920.	St. Paul, 546 Holly.
O'Leary, Paul Arthur	Long Island Coll. Hosp. 1915.	Rochester, Minn.
Wood, Thos. Henry	U. of Ill., 1909.	Rochester, Minn.

THROUGH RECIPROCITY

Donohue, Phillip F.	St. Louis U., 1920.	St. Paul, 1481 Summit Av.
Duiker, Henry	Rush, 1920.	Hibbing, Minn.
Eisele, David C.	U. of Mich., 1917.	Coleraine, Minn.
Frost, Harry T.	Northwestern, 1920.	Crookston, Minn.
Good, Brooks David	Tulane, 1919.	Biwabik, Minn.
Gumbiner, Alfred A.	Long Island Hosp. Med. Coll., 1902.	Rochester, Minn.
Halenbeck, Phillip L.	Rush, 1919.	Crosby, Minn.
Hutterer, Edward George	Sioux City Coll. of Med., 1907	Cold Springs, Minn.
Kline, Harry W.	Hah. Chic., 1919.	Anoka, Minn.
Kramer, Gabriel B.	Baltimore Med. College, 1907	St. Paul, care of City Hospital.
Mattill, Peter Milton	Rush, 1919.	Hibbing, Minn.
Osborne, Earl Dorland	U. of Mich., 1919.	Rochester, Minn.
Pierson, Claude M.	Trinity, 1901.	Ambrose, N. D.
Rundlett, David L.	Tufts, 1901.	Sioux Falls, S. D.
Shastid, Thos. Hall	U. of Vermont, 1888.	Duluth, Minn.
Stevenson, Frank W.	Rush, 1919.	Minneapolis General Hospital.
Walker, Ralph Eric	U. of Mich., 1907.	St. Paul, 1111 Lowry Av.
Wilson, Edmund W.	U. of Iowa, 1896.	Rolfe, Iowa.